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ABSTRACT

This second phase of the Duke University planning study, the development process, includes the refinement and focusing of the educational program and space requirements and the delineation of the comprehensive campus plan in depth. Photographs and diagrammatic plans supplement the discussions and descriptions of the campus development plan and the campus design. A developmental sequence for implementation of the plan is included. Projected enrollment, faculty, and parking requirements are tabulated in the appendix. (FS)

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DUKE UNIVERSITY

DURHAM, NORTH CAROLINA

PHASE 2
COMPREHENSIVE CAMPUS PLAN

The Building and Grounds Committee
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CAUDILL ROWLETT SCOTT
ARCHITECTS PLANNERS ENGINEERS
NEW YORK HOUSTON

MAY 1966

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THE DUKE PLANNING STUDY

Duke University is faced with the problems which accompany growth. This growth is the inevitable response to a demand by increasing numbers of young citizens for excellence in education. The University must plan not only to accommodate more students, but to upgrade the physical plant as facilities become obsolete because of age, technology, and advanced teaching requirements. The University administration decided that a comprehensive campus plan was needed to answer some of the problems of how to grow in size and efficiency, without sacrificing the beauty of the natural landscape and the heritage of the existing campus.

This report is a summary of the plan. A wealth of information has been furnished by the University and utilized by the planners; however, in the interest of brevity and clarity, only the principal findings and recommendations are included in this report.

The planning study has been conducted in two major phases. Phase 1 was an investigative process, during which information concerning the educational program and physical plant was prepared by the University and analyzed by CRS and University officials. During Phase 1 alternative plan concepts and their implications were delineated for subsequent analysis by the University and a major direction for further development was established. The principal findings of the Phase 1 study are included in this Phase 2 report.

Phase 2, the development process, has included the refinement and focusing of the educational program and space requirements and the delineation of the comprehensive campus plan in depth. The planning has been coordinated with detailed planning of the Duke Medical Center (by E. Todd Wheeler and The Perkins & Will Partnership) and with plans of the State Highway Department and the City of Durham. At the same time, detailed planning of the future campus utilities systems has been conducted by Watson Engineers, Inc., of Greensboro, as a part of the total comprehensive plan.

During Phase 1 a design study was conducted to determine valid criteria for the construction of future buildings in the Gothic area of the campus. The findings were published in a separate report and are summarized briefly in this report. During Phase 2 similar architectural design studies were undertaken for the Woman's College and the central area. These findings are also summarized in this report.

It is only proper to point out that the most detailed comprehensive plan must be considered as a point of departure rather than a rigid picture of the future. The process of refining and modifying today's assumptions will begin tomorrow (if not today), and the plan must be continually adjusted to meet unforeseen demands. To this end the planners have attempted to provide flexibility and to document the assumptions and data used in order to provide a sound basis for change. At this writing several computer programs are being developed to assist in rapid analysis and updating of current space utilization and projected requirements on an annual basis to provide additional tools for plan modification.

ACKNOWLEDGMENTS

The development of the campus plan for Duke University has involved hundreds of persons over a period of three years. It would be impossible to properly acknowledge them all on a page. The studies and recommendations have been reviewed by two University committees, in addition to the Building and Grounds Committee of the Board of Trustees, listed on the title page. These are, UPPAC, the University Policy and Planning Committee; and EFC, the Educational Facilities Committee.

We are pleased to acknowledge double thanks to Dr. Douglas M. Knight as President of Duke University and as ex-officio chairman of UPPAC. Two other gentlemen have been helpful in double capacities. Mr. Gerhard C. Henricksen has counselled with us, both as a member of the Building and Grounds Committee, and as Vice-President for Business and Finance. Mr. John M. Dozier has given generously in time and leadership as Business Manager and as Secretary to the EFC, which has been chaired by Dr. Frank de Vyver. We are also indebted to Mr. W. E. Whitford, Assistant Business Manager, for a wealth of knowledge and advice, and to Mr. Henry D. Mayfield, Jr., University Architect.

We have enjoyed our three year association with this team. We are grateful, too, for the assistance of the many deans, department chairmen, faculty and administrative staff, unnamed in this list, who have contributed time and thought to the study.

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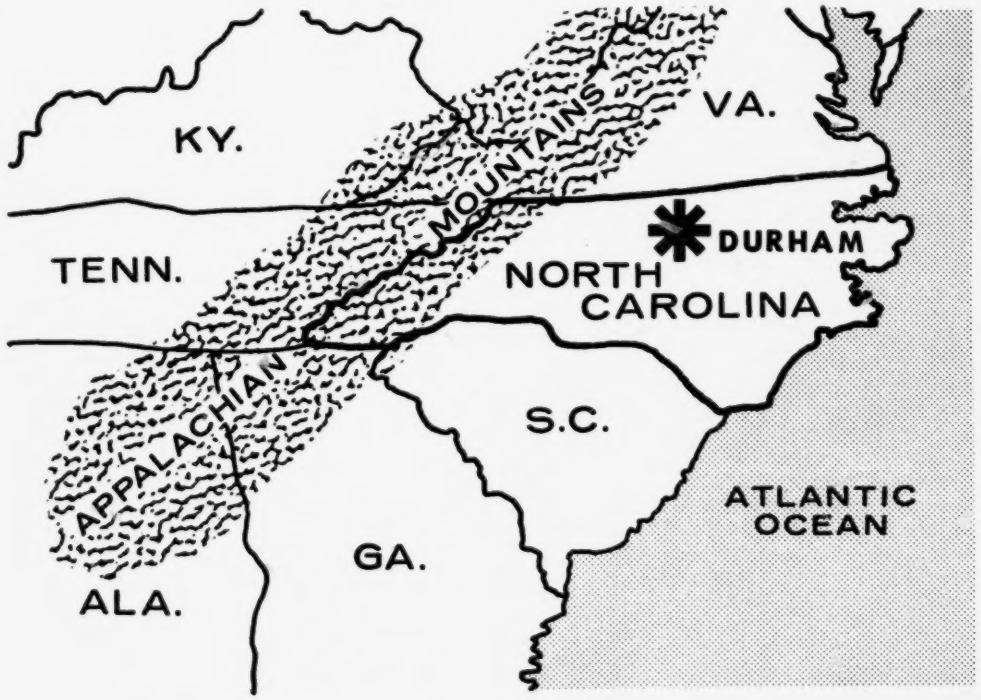
BACKGROUND



LOCATION

Durham is centrally located in the state, roughly midway between the delightful scenery of the Appalachian Mountains and the Atlantic Ocean. The area is generally heavily forested and rolling. Durham is a major center of the tobacco industry. The region also produces heavily in furniture and textiles.

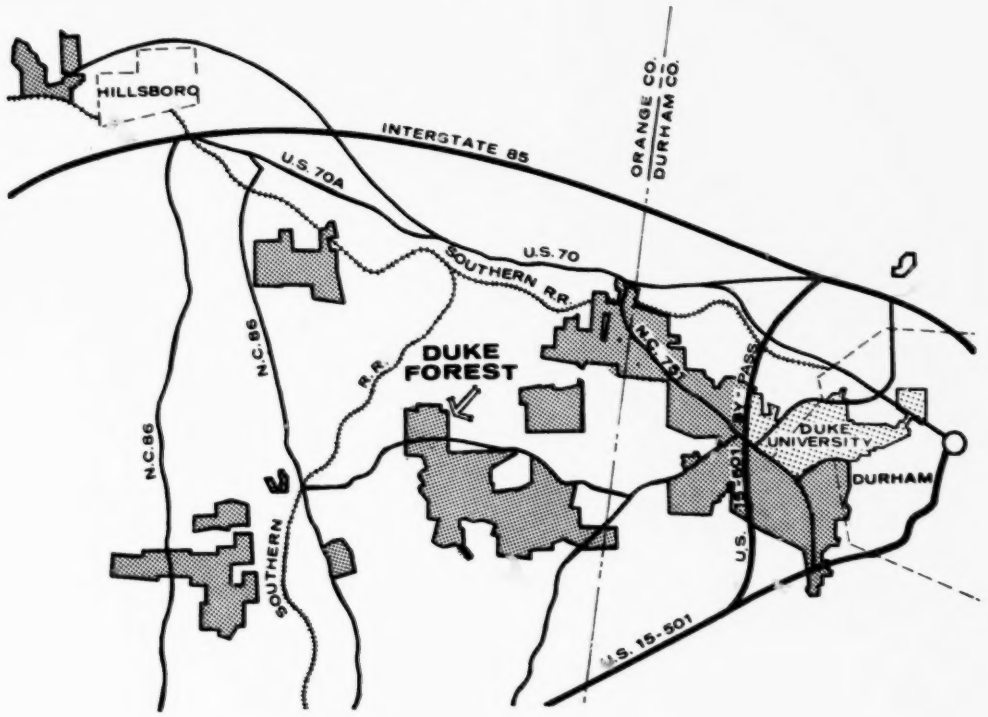
A closer look reveals an area of unusual educational and research activity. Raleigh, the state capital, is the home of North Carolina State University, as well as Meredith College, St. Mary's Junior College, Shaw University, Peace College, and St. Augustine's College. The University of North Carolina is at Chapel Hill and North Carolina College is located in Durham. Duke University, The University of North Carolina, and North Carolina State are assisting in the development of Research Triangle Park which is growing rapidly. Officials of the three universities are serving on the boards of directors of the governing and operating corporations of the Research Triangle. Faculty members are participating individually in consultation and research projects. The opportunities for development and interchange of knowledge make this a unique location.

HISTORY

The parent institution of Duke University, Brown's Schoolhouse, was an elementary school founded in the 1830's in Randolph County, North Carolina. By 1859 it had become a Methodist-sponsored liberal arts college named Trinity College. Its history on the present campus began with the relocation of Trinity College to the "east campus" in Durham in 1892. General Julian Carr donated the site, and Washington Duke contributed funds for the first building and endowment. President Kilgo founded the School of Law in 1904 and a Department of Education in 1907. By 1922 President Few (1910-1940) had plans for a School of Religion, a Medical School, and a Graduate School of Arts and Sciences. The Duke Endowment, created by James B. Duke, was established in 1924 and Duke University came into being. A large woodland tract one mile west of the existing campus was purchased. The old campus became the coordinate Woman's College when the new campus was occupied in 1930.

Trinity College continued as the undergraduate men's liberal arts college. The College of Engineering was established in 1939. The Graduate School of Arts and Sciences had been organized in 1926, and with the School of Nursing in 1931 and the School of Forestry in 1938 the full complement of professional schools was established.

By 1964 it was time again to reappraise commitments and purposes in the light of current resources and new opportunities. As early as 1959 the Long Range Planning Committee began a program study and published three annual reports. This reappraisal was completed in The Fifth Decade, a major report prepared by President Douglas M. Knight and his associates. The program expressed in The Fifth Decade is summarized in a subsequent section of this report and is the basic foundation for the campus plan.



URBAN RENEWAL AREAS

THE UNIVERSITY COMMUNITY

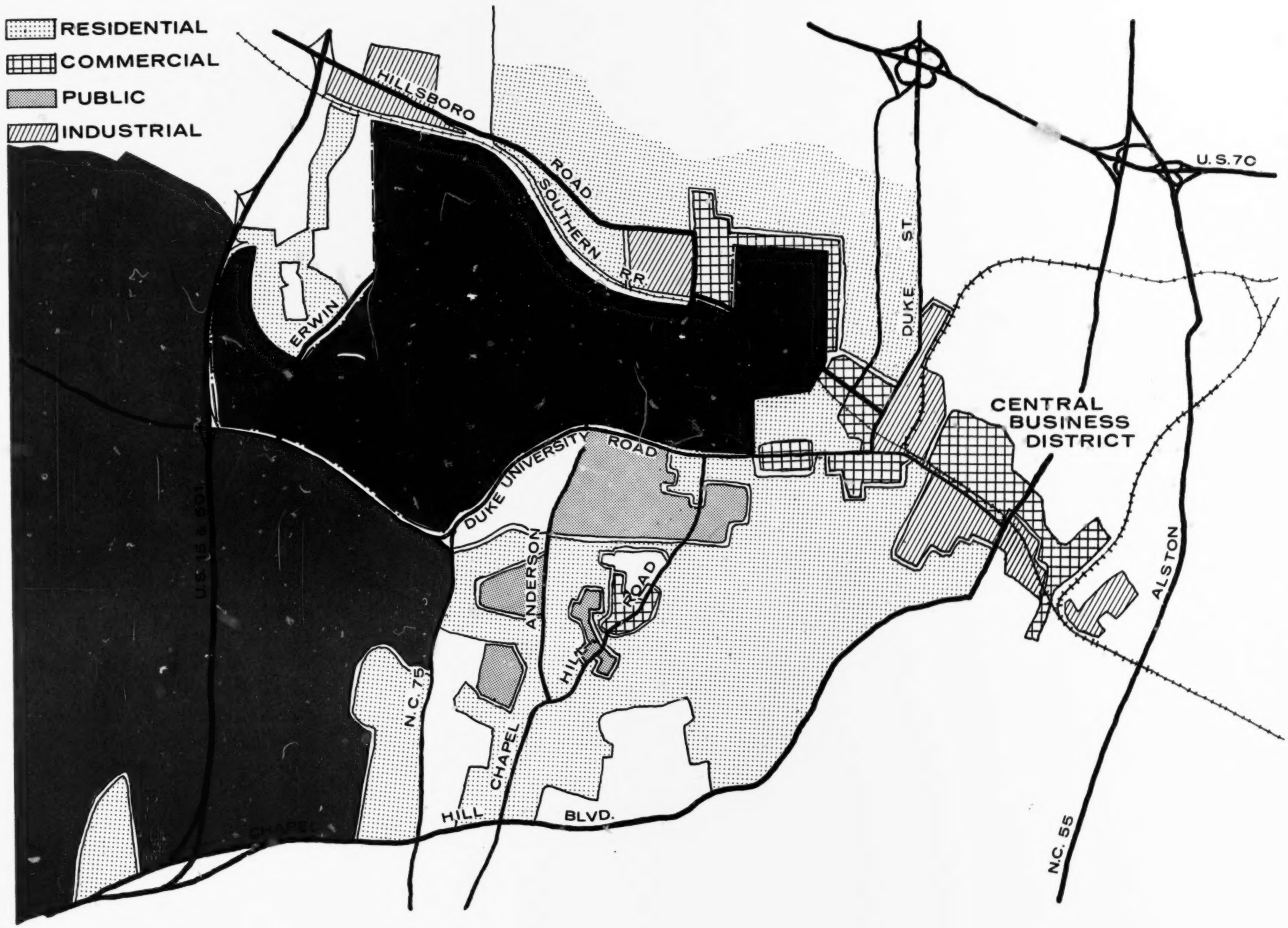
The colored portion of the map at right indicates the existing campus development and the area under consideration for future incorporation into the campus. The University is convenient to the central business district and to the highways leading to Greensboro (U.S. 70) and Chapel Hill (U.S. 15-501). I.S. 85 and U.S. 70 Bypass provide easy access to the airport and Raleigh.

The urban area between Anderson Street and Main Street contains a few substantial apartment projects but is mainly developed with low-cost housing which can eventually give way to campus development.

The area south of the campus along N.C. 751 is developing into faculty housing in the Duke Forest area and middle income housing to the east of the highway. The open area south of Duke University Road is occupied partly by the Duke Forest and partly by a large cemetery.

The area to the north of the campus between Erwin Road and the Southern Railroad contains a large Veterans Administration Hospital, an elementary school, several motels, and scattered low-cost and dilapidated housing. Part of this area is included in a proposed urban renewal project. An expressway will be constructed along the south side of the railroad from I.S. 85 to the central business district. Another area of low-cost housing, earmarked for urban renewal, lies directly to the southeast of the campus property.

The blocks directly west of the Woman's College campus are developed commercially, and those to the north and east in single family housing.

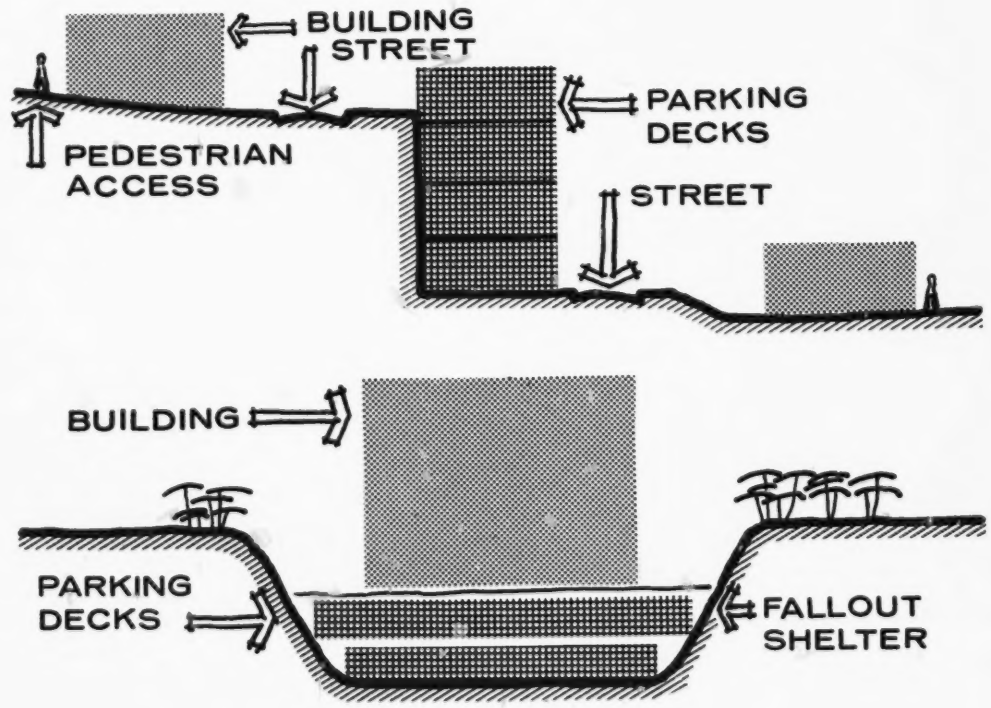

RESIDENTIAL
COMMERCIAL
PUBLIC
INDUSTRIAL
HILLSBORO
ROAD
SOUTHERN R.R.
ERWIN
DUKE ST.
U.S.70
CENTRAL
BUSINESS
DISTRICT
DUKE UNIVERSITY ROAD
U.S. 15 & 501
ANDERSON
HILL
ROAD
ALSTON
N.C. 75
CHAPEL
HILL
BLVD.
N.C. 55

TOPOGRAPHY

The variety of rolling land forms offer interesting potentials and limitations for campus development. Slopes in excess of 15%, indicated on the map, are generally considered difficult for building construction. However, these same slopes offer an opportunity to design parking structures which blend into the landscape and gain access to different levels with a minimum of ramping. Another peculiar result of the topography and road development on land fill is that most of the remaining building sites lie in hollows. In some cases this will allow parking levels below the buildings, bringing the building entrance up to road level. Bicycle use at Duke has been limited by the hilly terrain and by a lack of bicycle paths, especially from faculty and married student housing areas.

The topography becomes a serious consideration in the planning of views and open spaces; in many cases, a view which seems apparent on a flat map may in fact be blocked by a hill or ridge. Great care must also be taken to adapt construction to the site rather than using excessive cuts and fills which destroy trees and interrupt drainage.

Drainage is generally good, with only isolated problems. Several drainage courses offer a potential for creating lakes as a scenic feature. These might also function as holding reservoirs. With increasing "hard" development replacing the absorbency of the natural terrain, care must be taken to compensate with drainage improvements.



WOOD STREET
BUCHANAN STREET

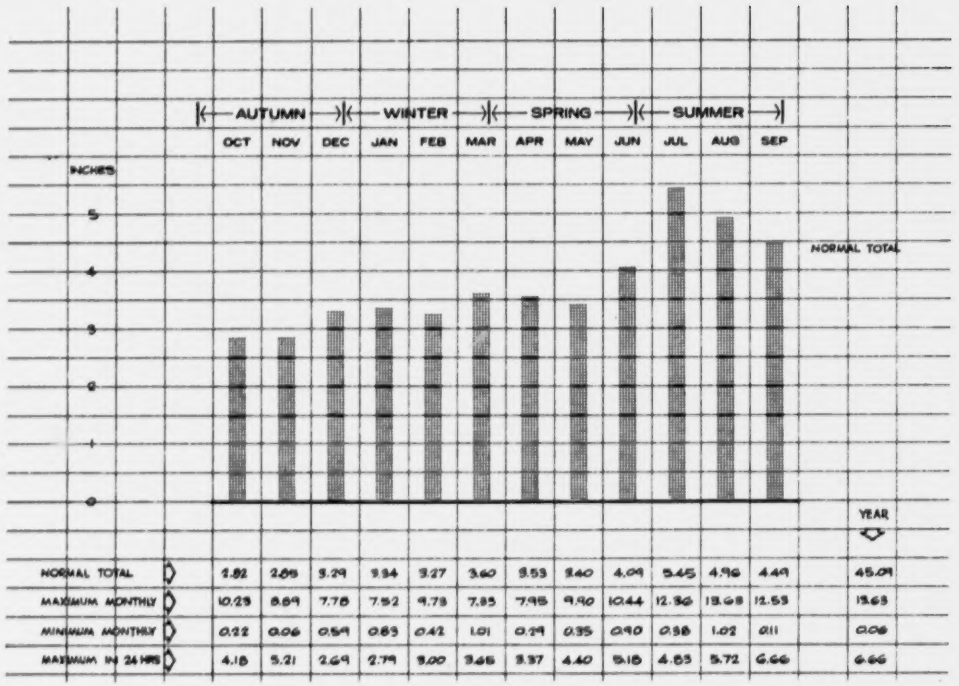
CLIMATE

Durham is too far from the Atlantic to be influenced by the coastal climate but is protected from the extremes of harsh continental winters by the Appalachian Mountains. Therefore the climate is moderate, with many pleasant days throughout the year.

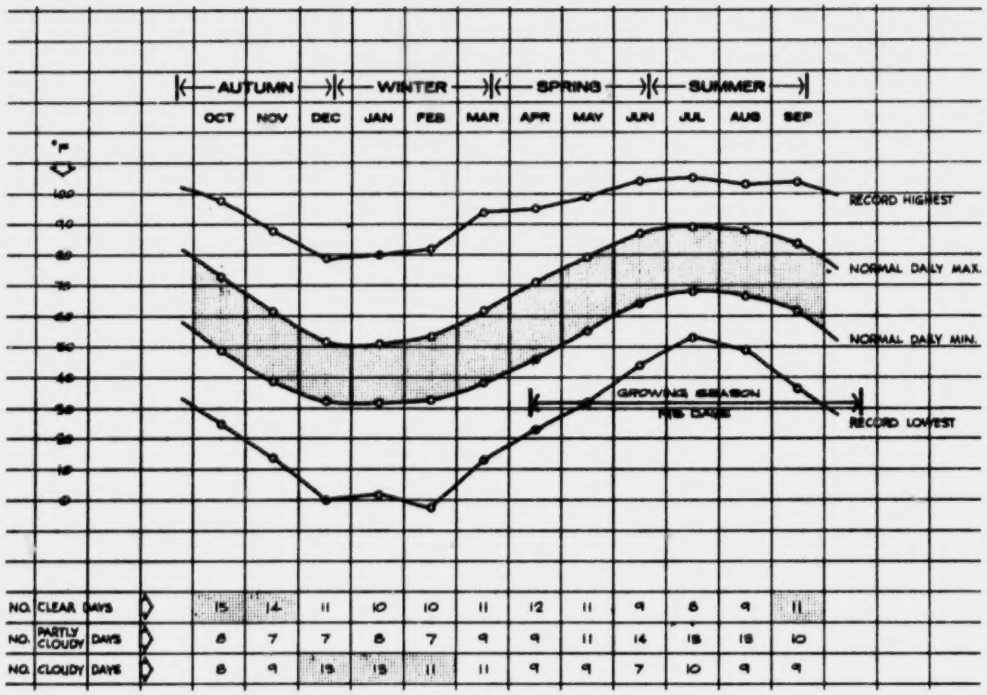
The charts summarize the significant climate data. They are constructed around the seasons rather than the calendar year so that the summer and winter extremes are readily apparent.

One major effect of the climate is ideal growing conditions for trees due to the abundant and evenly distributed rainfall and the presence of sufficient, but not devastating, winter weather. The annual average of seven inches of snow falls in a few occurrences and remains on the ground several days at most.

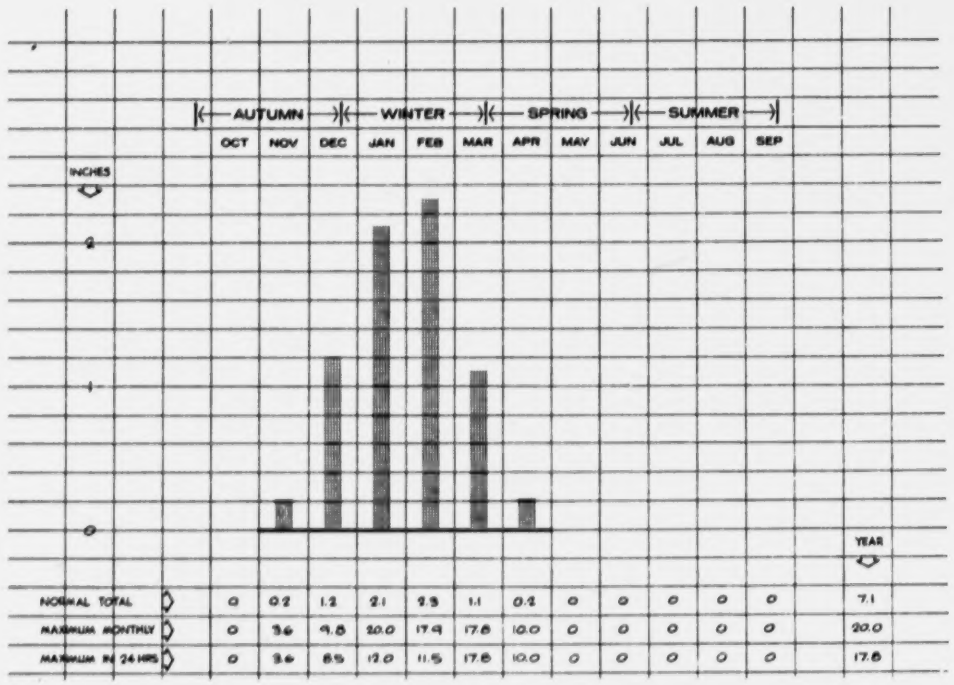
Summer temperatures rarely exceed 90°, and winter temperatures dip below freezing on 51 days on the average. Heating and cooling design temperatures range from 14° to 95°. The growing season is 195 days (freeze-free).



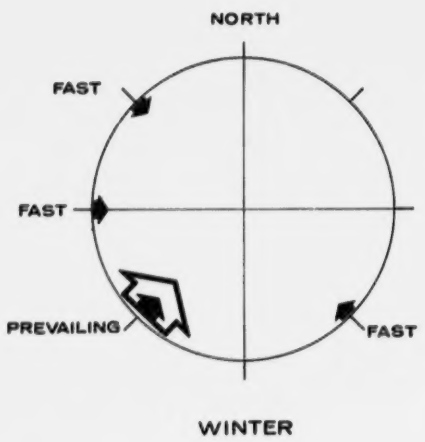
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	YEAR
NORMAL TOTAL	2.82	2.85	3.29	3.34	3.27	3.60	3.53	3.40	4.09	5.45	4.96	4.49	45.01
MAXIMUM MONTHLY	10.23	8.69	7.78	7.52	9.78	7.35	7.95	9.90	10.44	12.36	13.98	12.53	13.63
MINIMUM MONTHLY	0.22	0.06	0.59	0.83	0.42	1.01	0.29	0.35	0.90	0.38	1.02	0.11	0.06
MAXIMUM IN 24 HRS	4.18	5.21	2.69	2.79	3.00	3.65	3.37	4.40	5.18	4.83	5.72	6.66	6.66



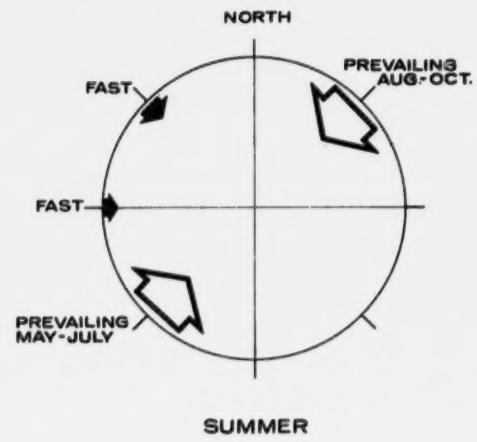
		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
NO. CLEAR DAYS		15	14	11	10	10	11	12	11	9	8	9	11
NO. PARTLY CLOUDY DAYS		8	7	7	8	7	9	9	11	14	15	13	10
NO. CLOUDY DAYS		8	9	13	13	11	11	9	9	7	10	9	9



	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	YEAR
NORMAL TOTAL	0	0.2	1.2	2.1	2.3	1.1	0.2	0	0	0	0	0	7.1
MAXIMUM MONTHLY	0	3.6	9.8	20.0	17.9	17.8	10.0	0	0	0	0	0	20.0
MAXIMUM IN 24 HRS	0	3.6	8.5	12.0	11.5	17.8	10.0	0	0	0	0	0	17.8



WINTER



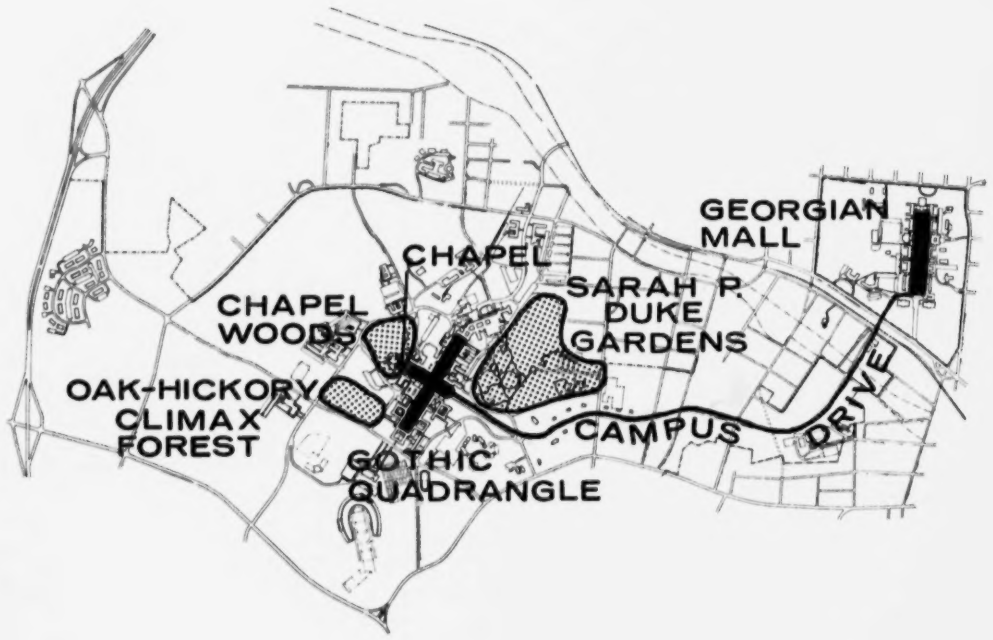
SUMMER

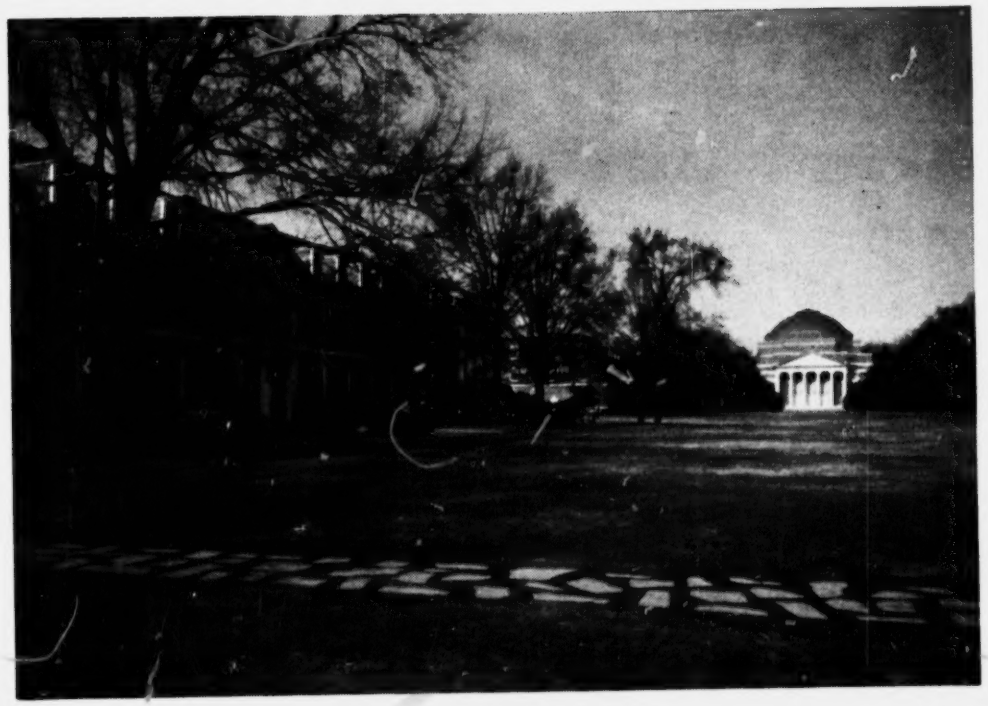
ASSETS

Duke is blessed with many fine advantages in its location, climate, institutional neighbors, and natural beauty. With a few exceptions, the University is housed in a first-rate physical plant. Plenty of land area is available for expansion, though unfortunately most of it is not in the best location for development of a unified campus.

Certain areas of the campus have been developed to a notably high degree of environmental appeal. The Georgian mall of the Woman's College and the Gothic quadrangle on the west, although quite different in character, are both beautifully designed and maintained and attract thousands of visitors annually. The Duke Chapel is one of the finest examples of "Collegiate Gothic" architecture to be found anywhere.

These and other assets must be maintained and enhanced as environmental anchors for future development.


GEORGIAN
MALL
CHAPEL
SARAH P.
DUKE
GARDENS
CHAPEL
WOODS
OAK-HICKORY
CLIMAX
FOREST
CAMPUS
DRIVE
GOTHIC
QUADRANGLE



PROBLEMS

Of course, if Duke did not have problems, much of the reason for this report would vanish. One of the principal motivations for the current planning effort was the realization that the type of departure from the Gothic architecture on the west (in search of economy) had proved detrimental to the character of the campus. A better solution was needed.

One of the most challenging problems has its roots in the division of the campus and the abundance of land available at its western extreme. The unlimited area for growth has led recent development into a pattern of dispersal which, although it tends to minimize the destruction of the natural landscape, poses serious problems of pedestrian circulation, academic isolation, and loss of unity. The original spatial coherence of quadrangle development, based on the pedestrian, has given way to "filling station" siting, and distances which require vehicular circulation. This type building siting might be described as "stringing beads" along streets rather than developing groups of buildings around pedestrian centers.

The formal quadrangle does have the disadvantage of becoming complete, and thus difficult to expand. The original buildings, although of high quality, have not lent themselves well to conversion to modern needs. And, of course, there is the ever-growing parking problem.

The University community imposes another set of problems. One is the increasing traffic congestion on certain streets such as Erwin Road and Anderson. Another is the environmental and economic problem of deteriorating low-cost housing in the campus neighborhood.

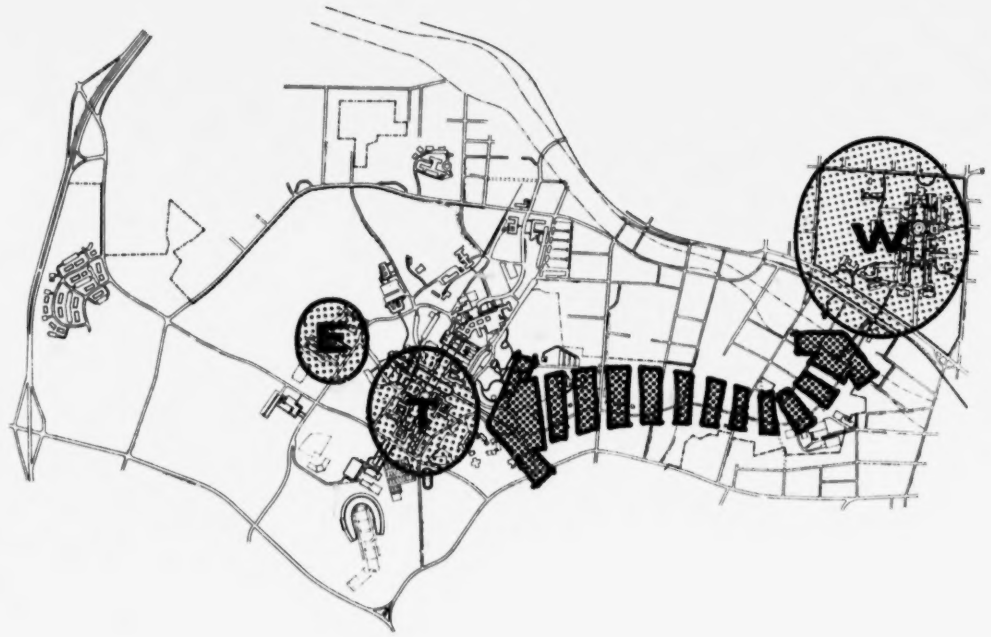
PHASE 1

Phase 1 dealt extensively with the problems of reinforcement of the identities of the undergraduate colleges, while maximizing the total unity of the University. These objectives are discussed in detail in the next section of this report.

Campus circulation and parking were analyzed, and several basic alternatives for major pedestrian and vehicular systems were developed. These were aimed at reducing pedestrian-vehicle conflicts and reinforcing the development and use of the transit system.

The major features of the campus landscape were also studied and directions established for capitalizing on existing assets and eliminating the few problems found.

The Phase 1 study concluded with the presentation of four alternative concepts for review by the University which are illustrated on the following pages. Each of these concepts was made as "pure" as possible for clarity of principles involved, and no one was selected in its oversimplified form for further development. Instead, it was felt that the best features of Concepts C and D should be employed, in the interests of practicality and balance.



CIRCULATION

3

DUKE CAMPUS

Concept A was designed to perpetuate the maximum identities of the Trinity and Woman's Colleges and the College of Engineering. All future development took place at the east and west ends of the campus. The College of Engineering was relocated to a new site for maximum growth and emphasis. This concept did little to resolve the dichotomy of the split campus. It utilized the prime central area as a scenic park for maximum retention of its existing character.

Concept B was not presented for serious consideration, but to illustrate the maximum potential for long-range unification of the University by consolidating all development at the west end. Its long-range implementation would require eventual disposition of the east campus and construction of a new Woman's College.

Concept C concentrated on academic reinforcement of the undergraduate colleges, with the shifting of all non-academic activities to the central area as a unifying influence. This is an attempt toward establishing a single unified campus with minimum dislocation of existing academic program and college image. Balance between the goals of unity and identity is achieved.

Concept D is a "new town" plan which calls for location of all new facilities, whatever their nature, in the central area. This concept retains the physical identity of the east and west areas in their existing architectural form and achieves unification through maximum development of the central area. It also requires the most extensive land acquisition.

In their review of Phase 1, the Educational Facilities Committee gave approval to "a composite of Plans 'C' and 'D' which might best be expressed as 'C+' and 'D-'." There were five major points approved unanimously by the Committee in their memorandum to the University Planning Committee, dated May 25, 1964. These were:

"1. In either Plan 'C' or Plan 'D' it is assumed by the Committee that no specific building sitings are intended by the draft presentations. Further careful study will be required to determine sitings.

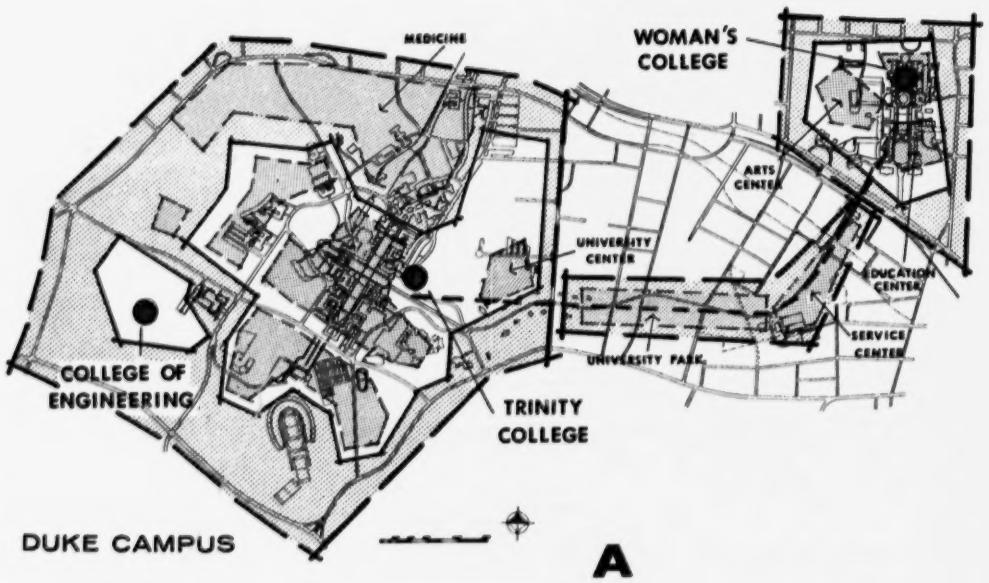
"2. A mix of academic and other facilities is an acceptable concept.

"3. The Committee disagrees with the notion in Plan 'D' that 'all future construction, regardless of use, would take place in the central area.'

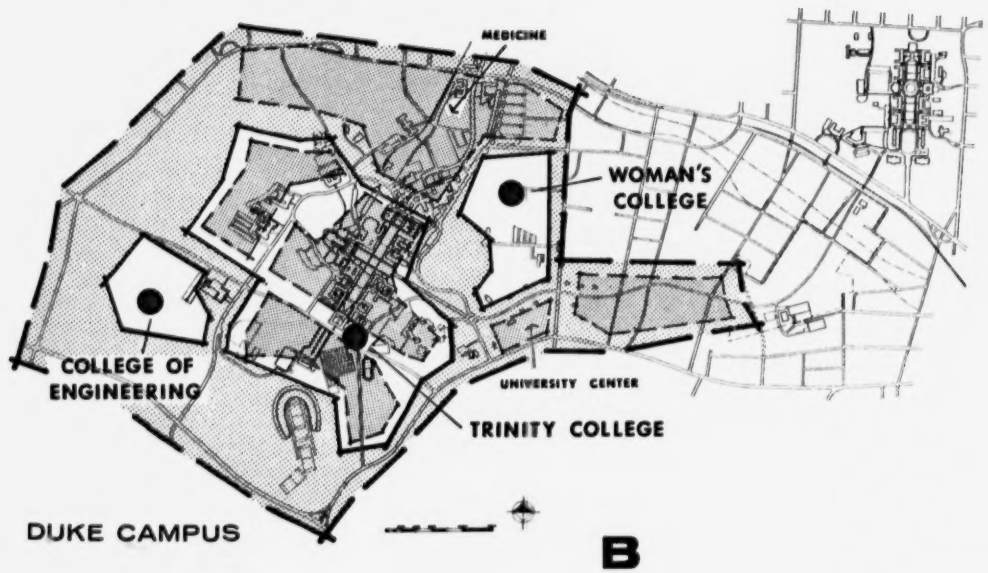
"4. Delays in land acquisition necessary for Plan 'D' and other campus additions considered desirable should not preclude the implementation of approved aspects of Plan 'C.'

"5. The Committee agrees to the consideration of a design departure to a more contemporary and functional 'new campus' for the central area without prejudice.

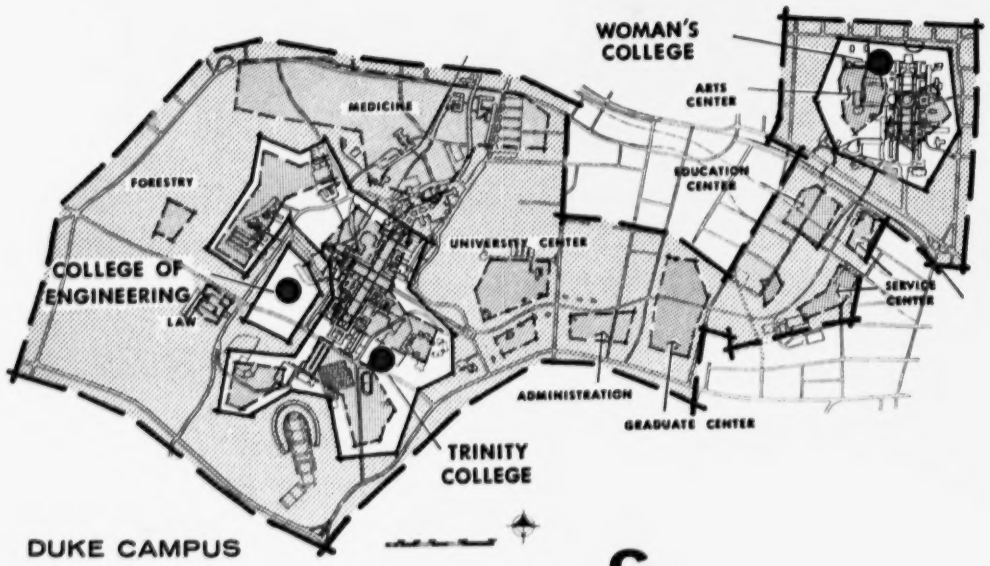
"In summary, the Committee feels that the land acquisitions for Plan 'D' are desirable, that the imaginative use of the central area between the East and West Campuses is sound, that a new design motif for the central area should be considered, that a careful amalgamation of Plans 'C' and 'D' should be worked out but that the rigidity of Plan 'D' is not acceptable and the limitations of Plan 'C' are not desirable."


MEDICINE
WOMAN'S COLLEGE
ARTS CENTER
UNIVERSITY CENTER
EDUCATION CENTER
SERVICE CENTER
UNIVERSITY PARK
COLLEGE OF ENGINEERING
TRINITY COLLEGE
DUKE CAMPUS

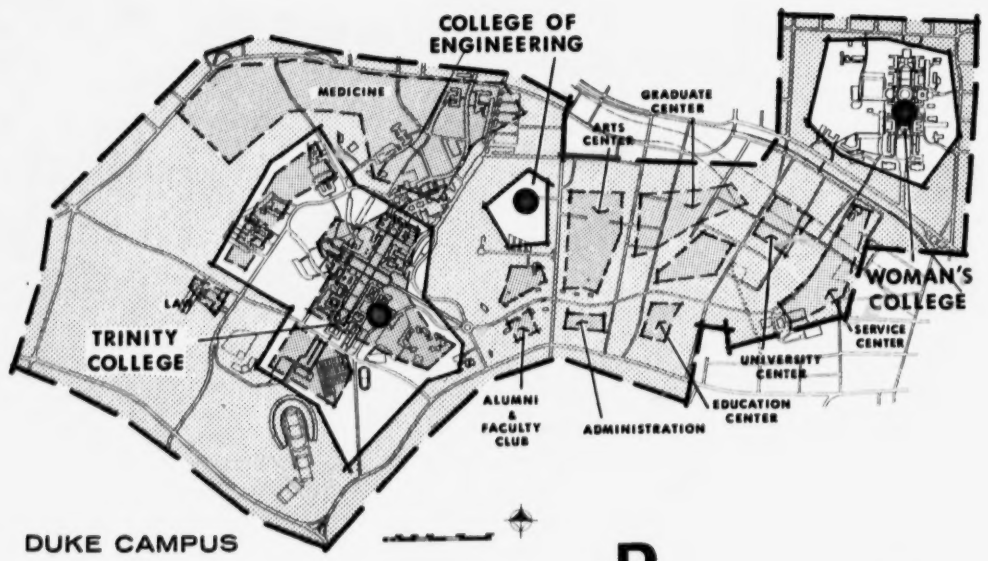
A


MEDICINE
WOMAN'S COLLEGE
UNIVERSITY CENTER
COLLEGE OF ENGINEERING
TRINITY COLLEGE
DUKE CAMPUS

B


WOMAN'S COLLEGE
MEDICINE
ARTS CENTER
EDUCATION CENTER
FORESTRY
UNIVERSITY CENTER
SERVICE CENTER
COLLEGE OF ENGINEERING
LAW
ADMINISTRATION
GRADUATE CENTER
TRINITY COLLEGE
DUKE CAMPUS

C


COLLEGE OF ENGINEERING
MEDICINE
GRADUATE CENTER
ARTS CENTER
WOMAN'S COLLEGE
LAW
TRINITY COLLEGE
SERVICE CENTER
UNIVERSITY CENTER
ALUMNI & FACULTY CLUB
ADMINISTRATION
EDUCATION CENTER
DUKE CAMPUS

D

APPROACH

A successful campus plan must achieve a sensible balance among four salient considerations:

PROGRAM	COST
DESIGN	TIME

Program is all important. It is the reason for the campus. Program involves the philosophy of the University; the goals, teaching methods and procedures of each department, space requirements, and numerous other facets of institutional operation.

Design is the expression of physical character and arrangement which results from considering function and environment. Included are such considerations as the functional grouping of buildings; circulation and land use patterns; relationships of campus and neighborhood; adaptations to climate, topography, and existing facilities; and concepts of space, form, color, and texture. The campus should provide a pleasant and stimulating environment for students and professors to live and work.

Cost is concerned with the economic feasibility of renovating or abandoning old structures; initial and continuing costs of buildings, landscape, and services; and the price of land.

Time has to do with the sequence of projects required to implement the plan. The useful life of buildings, availability of land, the effect of expansion on the community, utilities systems, and circulation requirements, all affect the feasibility and staging of construction. The plan must result in a campus which functions properly and is attainable both now and for many decades to come.

PROGRAM

During its studies in 1963, the Educational Goals Committee concluded "that a common sense of University purposes should pervade the students, faculty, and administration." The Committee felt that this is needed in order "to evaluate our performance, develop intelligent admission policies, devise a sensible curriculum, maintain proper relations with alumni and the public, and in general give direction and energy to our efforts." It is mainly the last of these benefits with which architectural campus planners are concerned.

A successful university plant is one in which the buildings are located and designed to serve the educational program. If the program must be modified to adapt it to the campus, which is too often the case, then the original design premises were wrong, or the plant is too rigid to adapt to change. Thus, the first and most important task during Phase 1 and subsequently was to learn as much as possible about Duke's program objectives.

The following summary represents the planners' understanding of the major program objectives upon which the campus plan should be based. It is derived from documents published by the University, conferences with administration and faculty, and review of the Phase 1 report by the Educational Facilities Committee.

MAJOR GOALS

A succinct statement of goals appears in The Fifth Decade report recently published by the University. This statement dedicates the University to the following commitments:

1. First, to liberal, general, pre-professional education as a major function of the University.
2. Second, to graduate and professional education in a variety of fields.
3. Third, to the moving frontiers of learning and to the international community of scholarship.
4. Fourth, to realistic participation in the affairs of our local, regional, national, and international communities.

Along with and arising from these four commitments, the University assumes a responsibility for the shaping of values and moral attitudes.

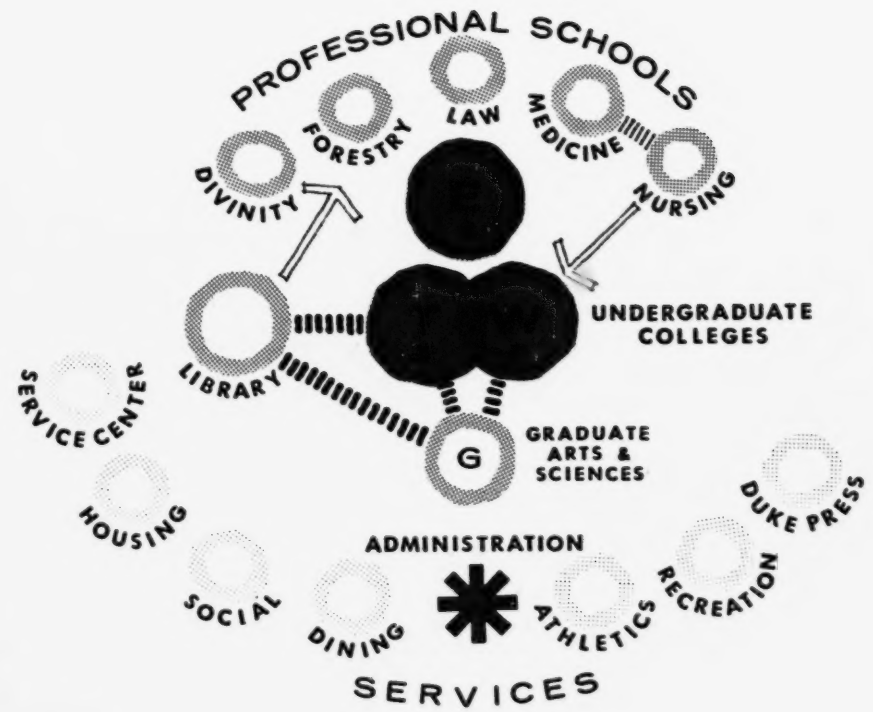
In terms of educational program, a major goal is BALANCE, between undergraduate and graduate programs, between teaching and research, and among the academic disciplines. This balance is to be achieved through:

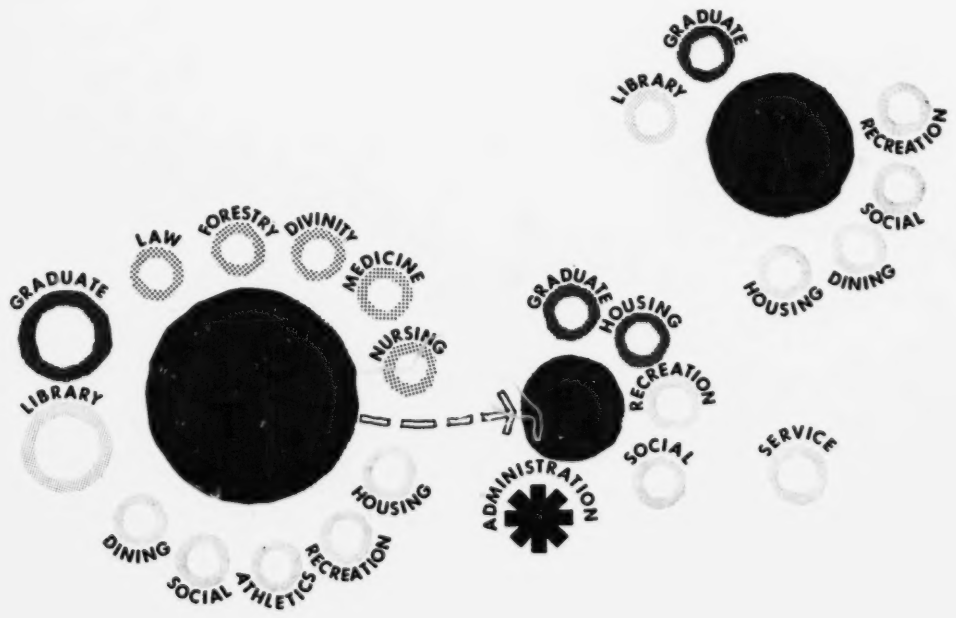
1. Continual improvement of undergraduate teaching.
2. Excellence and growth in graduate programs.
3. Excellence in research, but not at the expense of teaching.
4. Increased participation in activities outside the academic world, but not to an extent which would detract from the basic academic tasks.

IMPLEMENTATION

More specifically, nine basic steps are programmed to implement the educational goals of the University:

1. Increase the interdisciplinary approach, with cooperative courses at the undergraduate level.
2. Find new ways to involve students, including undergraduates, both in teaching and research.
3. Add or strengthen graduate programs in areas now minimal or non-existent:
   a. New: Art, Classics, Music, Russian
   b. Increase to Ph.D.: Mechanical Engineering, Geology, German
   c. Improve Ph.D. Program: Electrical Engineering, Philosophy, Romance Languages
4. Add or improve programs at less advanced levels than now offered, such as a master's degree in Forestry, associate degree program in Nursing.
5. Add new programs when resources to support them are available (i.e., a Graduate School of Business).
6. Revise the professional program in the School of Medicine.
7. Emphasize a total concept of education with informal intellectual activity in residence halls, a program of continuing education, institutes, and other special courses.
8. Increase the number of research scholarships.
9. Improve and expand the Duke Press.





EDUCATIONAL ORGANIZATION

Two aspects of the organization of activities at Duke must be considered — the programmed functional relationships and those resulting from the geography of the campus.

FUNCTIONAL RELATIONSHIPS

A single group of teaching departments serves the Graduate School of Arts and Sciences and the three undergraduate colleges, Trinity College, Woman's College, and the Engineering College. The five professional schools function more as independent entities with separate faculties, but are served as required by the central departments. The School of Nursing, with a separate faculty, is connected with the School of Medicine and The Arts and Sciences for instruction. Similarly, the Engineering College operates both as an undergraduate college served by the central teaching departments and in the manner of a professional school with a separate facility and faculty for its engineering curriculum. The academic functions are supported by the college and university services which include housing, the general library and central administration.

GEOGRAPHIC RELATIONSHIPS

If the geographic relationships of these same functions are diagrammed, a somewhat different picture results. The academic program is coeducational and, after the freshman year, both men and women undergraduates attend classes at either end of the campus at their own discretion, regardless of the college affiliation. Thus, academically, Trinity College and the Woman's College function in two locations. The College of Engineering will be located in a new building in the central area, and its students will attend classes in all three areas. Generally speaking, the

arts are taught on the east, the natural sciences on the west, and the humanities and social sciences in both locations. Services are duplicated as necessary on the east to support the Woman's College, where all undergraduate women (except nursing students) reside.

UNITY AND IDENTITY

In terms of its physical plant and educational traditions, Duke is committed to the twofold ideals of:

1. Unity: Reinforcing, educationally and physically, the unity of the University as one institution with one campus.

2. Identity: Maintaining and reinforcing the identities of its traditional undergraduate colleges; Trinity College, Woman's College, and College of Engineering.

The degree to which both these goals can be achieved depends largely upon the manner in which the coordinate college system is to be interpreted and developed at Duke. In explaining the coordinate role of the undergraduate colleges, the Educational Facilities Committee made the following statement:

"It is believed that a more accurate picture is one of coordinate colleges undergirding and supplementing, with various programs, the undergraduate education offered at the university level. The instructional departments 'belong' neither to Trinity College nor the Woman's College. What is considered important to the colleges is that formal education should be closely related to residential situations in order to help create an intellectual climate in the light of which the colleges may play their supporting and supplementary role in the total education of the students concerned."

At present there are three applications of this philosophy among the three undergraduate colleges. Following is a summary of the planners' understanding of the position and goals of each:

TRINITY COLLEGE. The identity of Trinity College is administrative and residential. Male undergraduates majoring in the liberal arts register in the College and are housed on the west area of the campus. The men's residence halls are administered by Trinity College. Its officers are assisted in reaching policy decisions by the deans of the College of Engineering since engineering students are also housed there. The college deans are responsible for counseling all freshmen and more advanced students who have not yet selected a major. They are also responsible for assuring that all students fulfill the requirements set by the faculty for satisfactory progress toward graduation. No geographic identity is really established for Trinity College since the other facilities on the west — including the Chapel, Union, Library, and central administration — relate to the total University.

Major efforts to reinforce Trinity College identity will be through the following:

1. Strengthening the intellectual life and self-government of the residence halls through an active program stimulated by "Trinity College fellows" and their faculty colleagues associated with the halls, by academic programs, lectures and displays in the residence halls,

and by the development of commons rooms and house libraries as areas for browsing and small group discussions.

2. Establishing the undergraduate library in the renovated portion of the main library building as the Trinity College Library.

Considerable interest has also been expressed by the Trinity College Dean and his staff in creating a new 24-hour food service center convenient to but not within the residence halls complex. A consolidation of Trinity offices, conference rooms, and services would be an obvious way to create a more recognizable physical identity.

THE WOMAN'S COLLEGE. Its separate geographic location gives the Woman's College an obvious and strong identity. This is one of five elements considered at Duke to be essential to sustain a coordinate woman's college:

1. A degree of separate physical identity while maintaining access to the University's libraries and teaching faculty at some levels and in some areas of instruction.

2. Administrative identity, with control of house systems, social programs, student health, etc.

3. A women's program of physical education.

4. A women's student government in which students of the Woman's College assume responsibility for many of the things which affect their lives most directly.

5. Specific extracurricular activities for Woman's College students in addition to those undertaken at the all-University level.

Probably the most important element in coordinate college status is that the college should represent an area of intellectual activity as a part of the total intellectual life of the University.

These elements are all incorporated in the present Woman's College. However, there has been a marked dilution of intellectual focus on the woman's campus through migration of many departmental offices and much classroom activity to new quarters on the west. The major goal for the Woman's College is to reaffirm and reinforce that area of the campus as an intellectual center. The following methods are being considered:

1. Increase the amount of formal classwork by adding to and upgrading the physical plant for logical areas of instruction.

2. Increase the out-of-class opportunities for intellectual stimulus through improving study facilities and environment of residence halls, adding seating and study areas in the library, developing a system of smaller dining facilities oriented to the residence halls to encourage faculty-student contacts, and remodeling the dormitories to permit a system of "resident house fellows."

3. Increase the number and quality of conference facilities and faculty offices including departmental offices, and organize them for logical relationships among disciplines and better student access.

4. Enrich the co-curricular and extra-curricular programs, partly through the addition of facilities for social, recreational, and cultural activities.

THE COLLEGE OF ENGINEERING. The College of Engineering is co-educational, although few women are enrolled, and nonresidential in identity. Here the identity is academic, with separate facilities and faculty for engineering instruction.

The major goals of the College of Engineering will tend to shift its status to that of a professional school rather than a coordinate college, with increases both in graduate students and women students. Research project activity will receive major attention in a manner which will increase student awareness of engineering opportunities and responsibilities. The academic program will continue under the existing three departments, but in a more flexible and unified manner.

THE TOTAL UNIVERSITY

The reinforcement of the identities of the undergraduate colleges is an important goal, but within the context of Duke University as a united whole. The physical and educational unity of the total University, including its graduate and research programs, the professional schools, its social and cultural programs, and its service requirements, are to be of overriding concern in the arrangement of the physical plant.

PLANNING IMPLICATIONS

In summary, the key implications of the existing program and the arrangement of the physical plant are:

1. The educational organization stresses University unity through the single system of liberal arts departments and the dispersal of instruction to co-educational classes throughout the campus.

2. The geography of the campus and the separation of women's housing and dining on the east reinforces the identity of the Woman's College. Geography should permit similar identity to be established for Trinity and Engineering so long as these objectives do not run counter to the goal of University unity.

3. Its separate academic facility and program give identity to the College of Engineering.

4. The housing of Trinity and Engineering men in the same facilities, plus their joint use of the Union with the rest of the University for dining and social activities, blurs their college identities in favor of University unity and the stimulation of intellectual discovery through interdisciplinary contact.

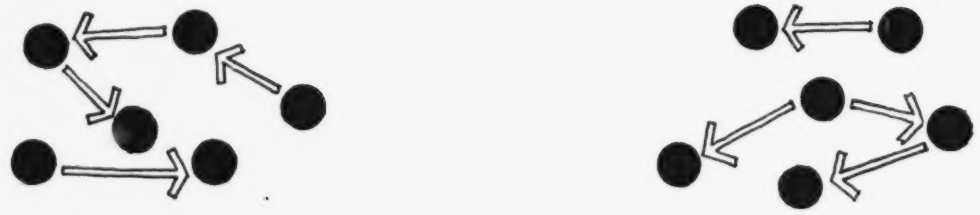
5. Trinity College has the least in the way of exclusive physical facilities or separation to establish identity.

What does the apparent duality of the objectives of unity and identity mean in terms of the physical arrangement of future facilities? The planners have attempted to simplify an approach by reducing University functions to two basic kinds of activities:

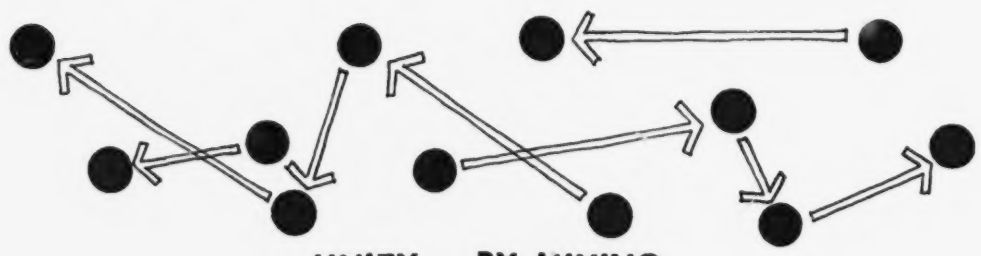
1. Generic Activities: Those of a general or repeating nature such as housing, dining, general classroom instruction.

2. Unique Activities: Those of a nonrepeating nature or requiring specialized facilities such as the library, auditoria, stadia, chapel, student center.

GENERIC ACTIVITIES



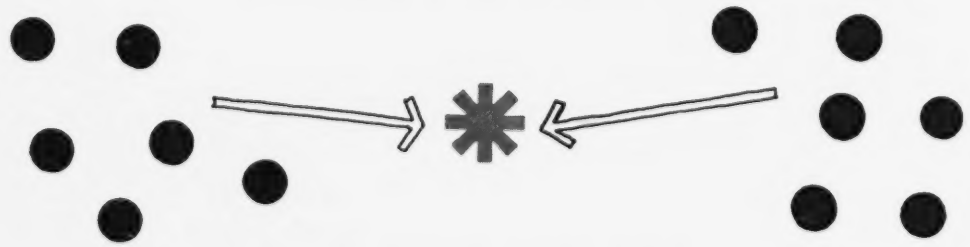
IDENTITY - BY SEPARATION



UNITY - BY MIXING

UNIQUE ACTIVITIES

IDENTITY - BY DUPLICATION



UNITY - BY JOINT USE

The arrangement of these facilities, the movement among them, and the student mix within them will be a considerable determinant of the degree of unity or identity achieved. For example, college identity would be strongly reinforced through duplication of housing, student centers, libraries, and classrooms for each college. Unity is established by joint use of central facilities.

The implications of this approach are:

1. Identity can best be reinforced by separation of generic activities and duplication of unique activities.

2. Unity can best be achieved by mixing generic activities (as in the present educational organization) and by establishing joint use of unique facilities.

The planning challenge is to arrange the campus to promote a merging of the coordinate college with the unified University educational and cultural program in a way that will give the colleges an intellectual climate in addition to the physical identity of their residential and supporting activities. To the extent to which the goals of unity and identity are in conflict with regard to a particular project, a decision must be made as to which will best further the overall educational goals of the University for the students who are most affected. This will be the physical implementation of the goal of BALANCE.

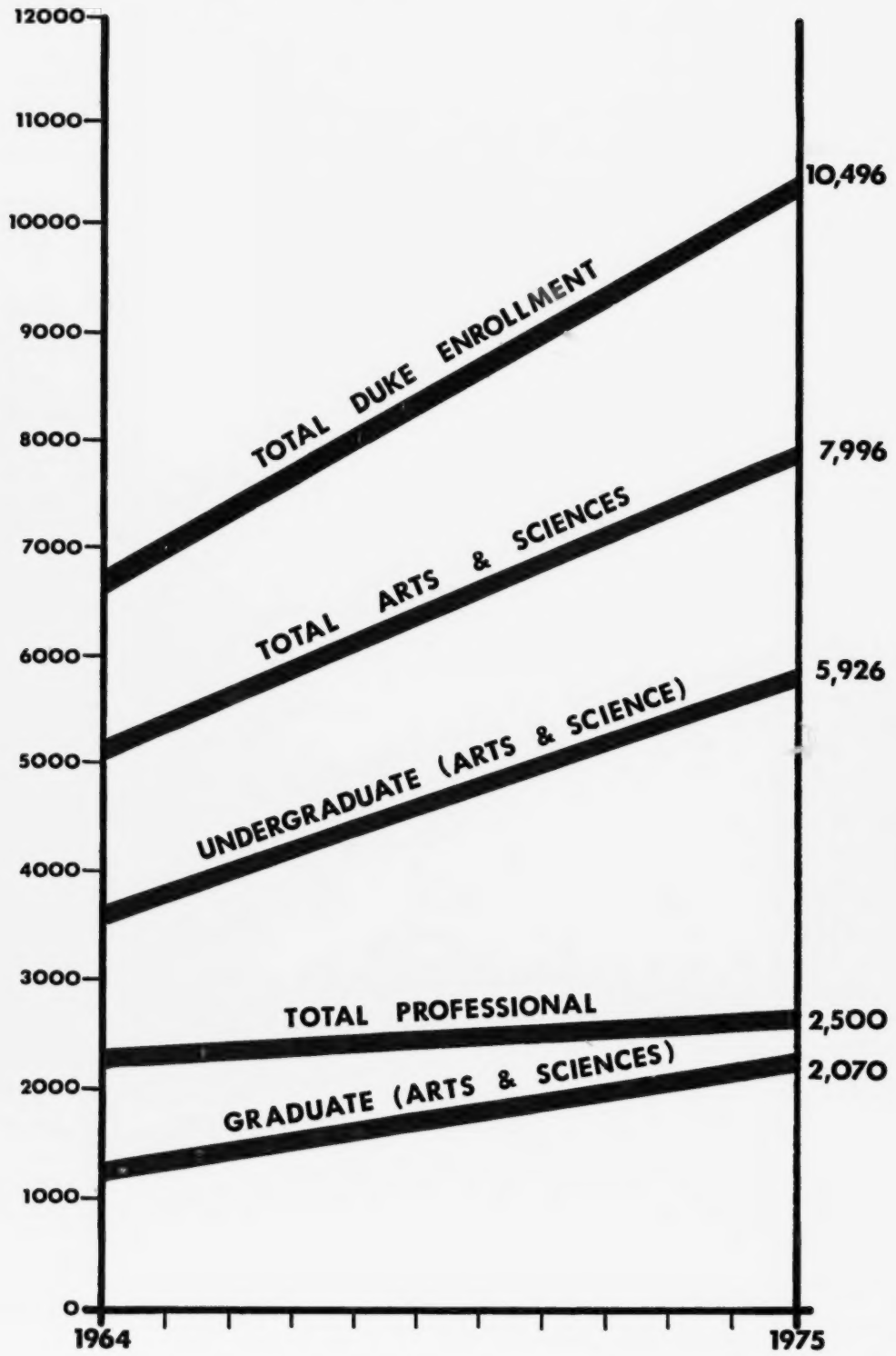
TEACHING METHODS

Duke University continues to favor personal teaching, with emphasis on individual and small group instruction. There has been some increase in larger lecture sections in combination with existing methods. No major departure in methods is anticipated, and there will continue to be a requirement for many small classrooms, seminar rooms, and conference rooms.

Little emphasis has been placed on recent developments in audio and visual teaching technology, except for applications by the School of Medicine. However, some of these methods could be applied in the future as a technique for allowing gifted teachers to reach more students. This, in combination with a greater degree of faculty mobility, could be utilized to achieve more teaching activity on the east campus, and later, in facilities to be built in the central area. This, in turn, could help implement the goal of unity by bolstering the intellectual climate of the entire campus.

GROWTH

Enrollment growth, as projected by the University, will increase from a total of 6,733 students in 1964 to 7,874 in 1970, and to 10,496 in 1975. These figures represent the expected maximum student body enrolled at one time (normally the fall enrollment). Beginning in 1970 the projections are based on the assumption that some form of increased year-round utilization will result in 2/3 of the total student body being enrolled on campus at one time. Systems are now being studied by the administration with the objectives of achieving more efficient use of the physical plant and increasing educational opportunities.



SPACE REQUIREMENTS

A considerable increase in construction has been programmed both to accommodate growth and to modernize and improve the quality of facilities. Anticipated space requirements have been translated into the proposed projects shown at right. Stage A includes those projects for which construction contracts are to be awarded by July 1, 1968. Stage B includes projects to be contracted from July 1, 1968, to July 1, 1975. In addition, projects being considered for the following decade are listed. The buildings for which planning is now underway are indicated with an asterisk.

Considerable renovation of existing buildings has taken place in the past few years and this process will continue. These are mainly qualitative improvements rather than space additions. Recent renovations plus the projects now in planning will leave the University well supplied with academic space. Most of the required projects are special facilities and support services, needed to round out the research, residential, social, and cultural programs of the University. Among these is a proposed performing arts hall to be jointly sponsored by Duke and the City of Durham, which will seat 3,000 to 3,500 persons and contain dining and conference facilities.

NEW CONSTRUCTION

	Area - Gross Square Feet
STAGE A, 1965-1968	
EDUCATIONAL BUILDINGS - GENERAL	
*Main Library	204,000
*Chemistry Building	146,440
*Men's Physical Education	
Pool	29,925
Courts	16,100
*Phytotron	34,500
*Engineering Building	195,000
Arts Center Phase 1 (Music)	54,500
*Accelerator	22,700
Women's Physical Education	50,000
*Divinity School Addition	48,530
EDUCATIONAL BUILDINGS - MEDICAL	
*Medical Science I	135,572
*Clinical Research II	54,591
Administration and Library	260,866
Medical Education	116,656
Minimal Care Hostel	54,166
STUDENT HOUSING AND ACTIVITIES	
*Housing - Undergraduate Women	
348 Beds, Dining	99,200
Woman's College Student Center	40,000
Housing - Undergraduate Men	
260 Beds, Dining	121,000

SERVICE FACILITIES

*Garden House	3,180
*Service Center Phase 1	101,000
*Electric Substations #1, 2, 3	
*Central Chiller Unit - Medical Center	
Telephone Center	18,000
*Parking Structures	

STAGE B, 1968-1975

EDUCATIONAL BUILDINGS - GENERAL

Arts Center Phase 2 (Art)	44,500
Woman's College Library Addition	20,000
Baldwin Auditorium Addition	15,000

EDUCATIONAL BUILDINGS - MEDICAL

Hospital and Clinical Sciences	452,000
Hospital Chapel and Courtyard	10,500
Medical Sciences II and Vivarium	270,000
Clinical Basic Sciences	72,000

STUDENT HOUSING AND ACTIVITIES

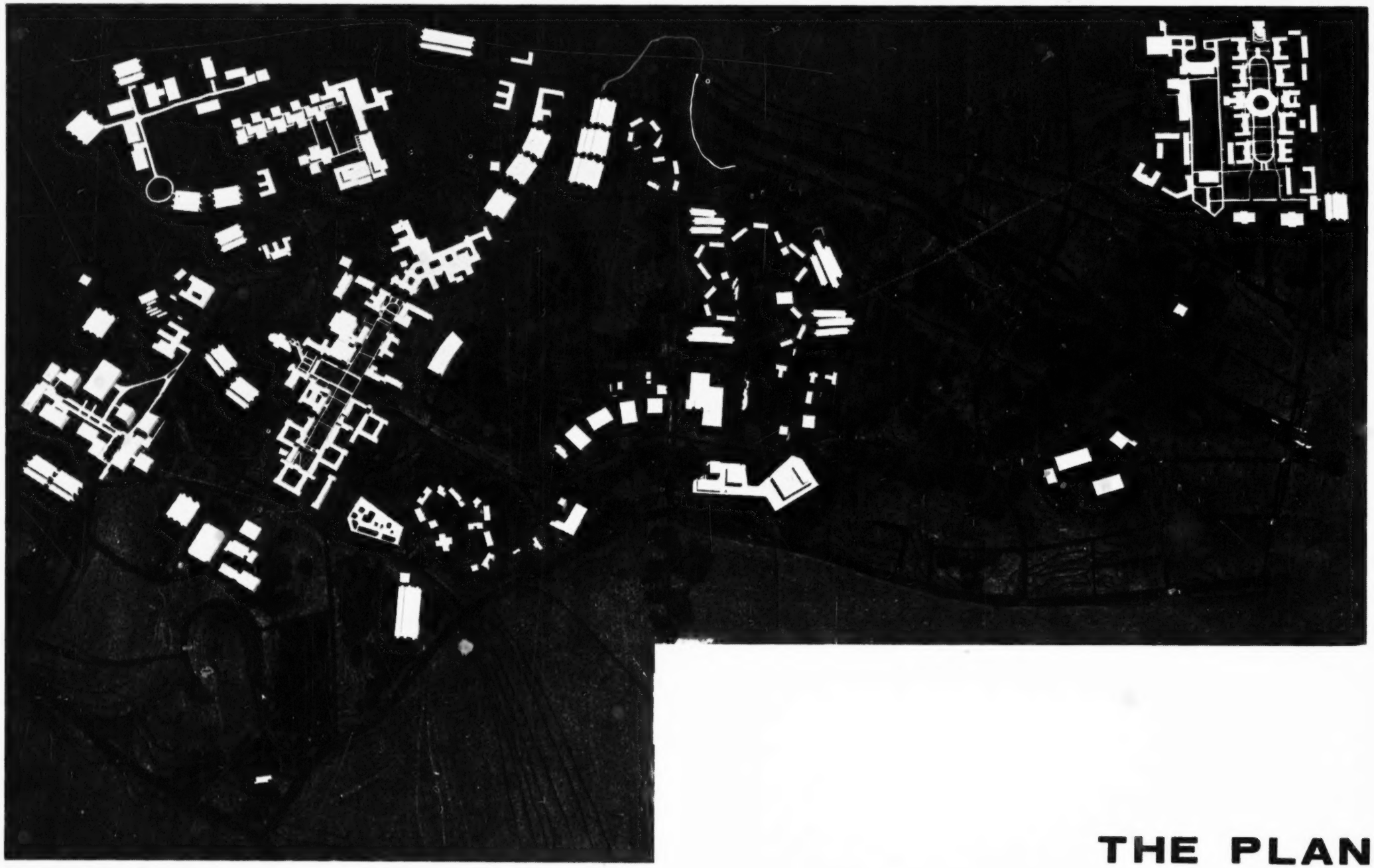
Housing - Undergraduate Men, 320 Beds	100,160
Graduate Residence Center	191,000
Campus Commons - Central Area	8,000
Recreation Facility - Central Area	10,000
Housing - Undergraduate Women	99,750
Duke - Durham Performing Arts Hall	160,000

SERVICE FACILITIES

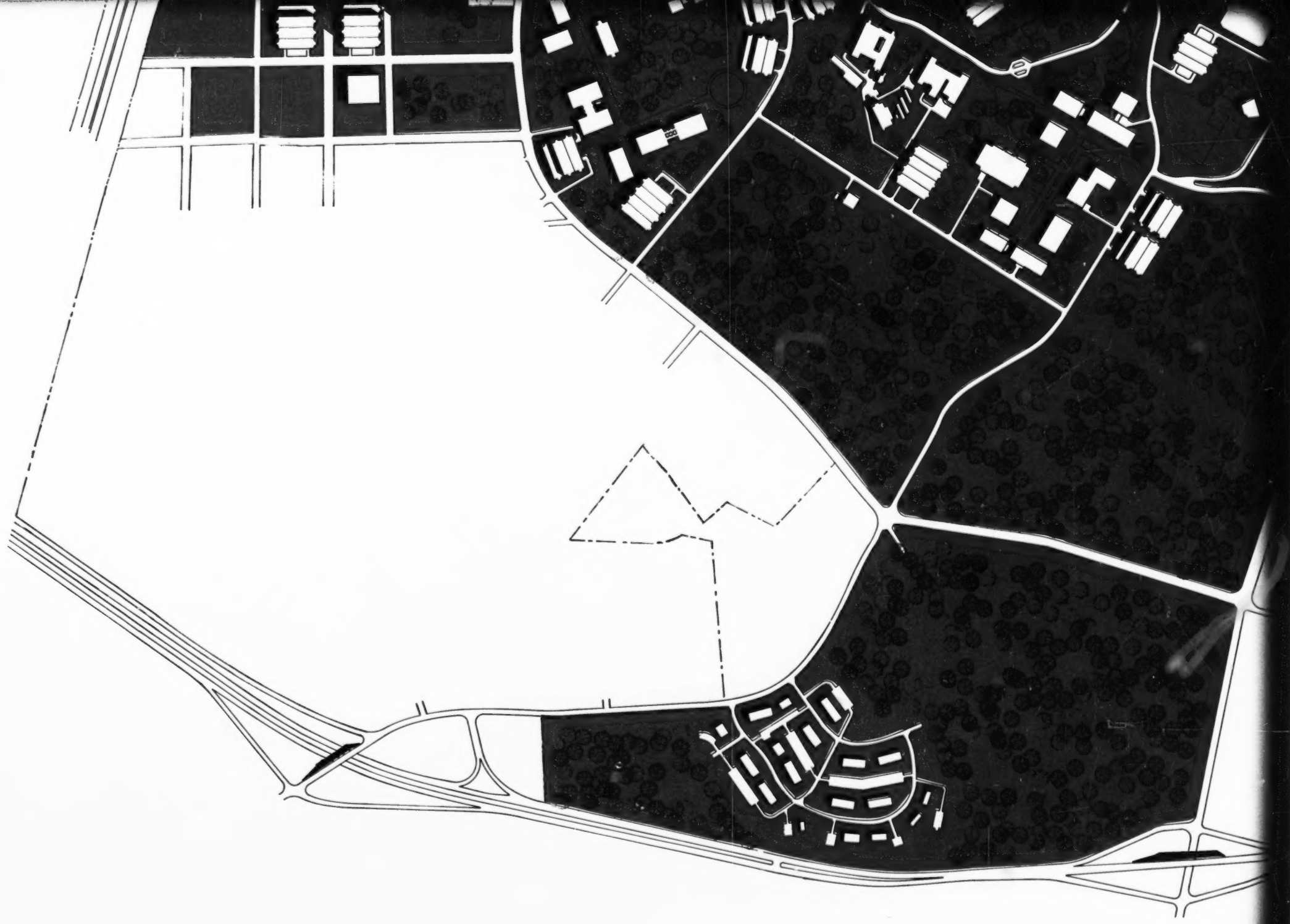
Service Center Phase 2	84,400
Student Health Unit	3,670
Duke Press	12,000
Faculty Club	
Electric Substations #4, 5	
Parking Structures	

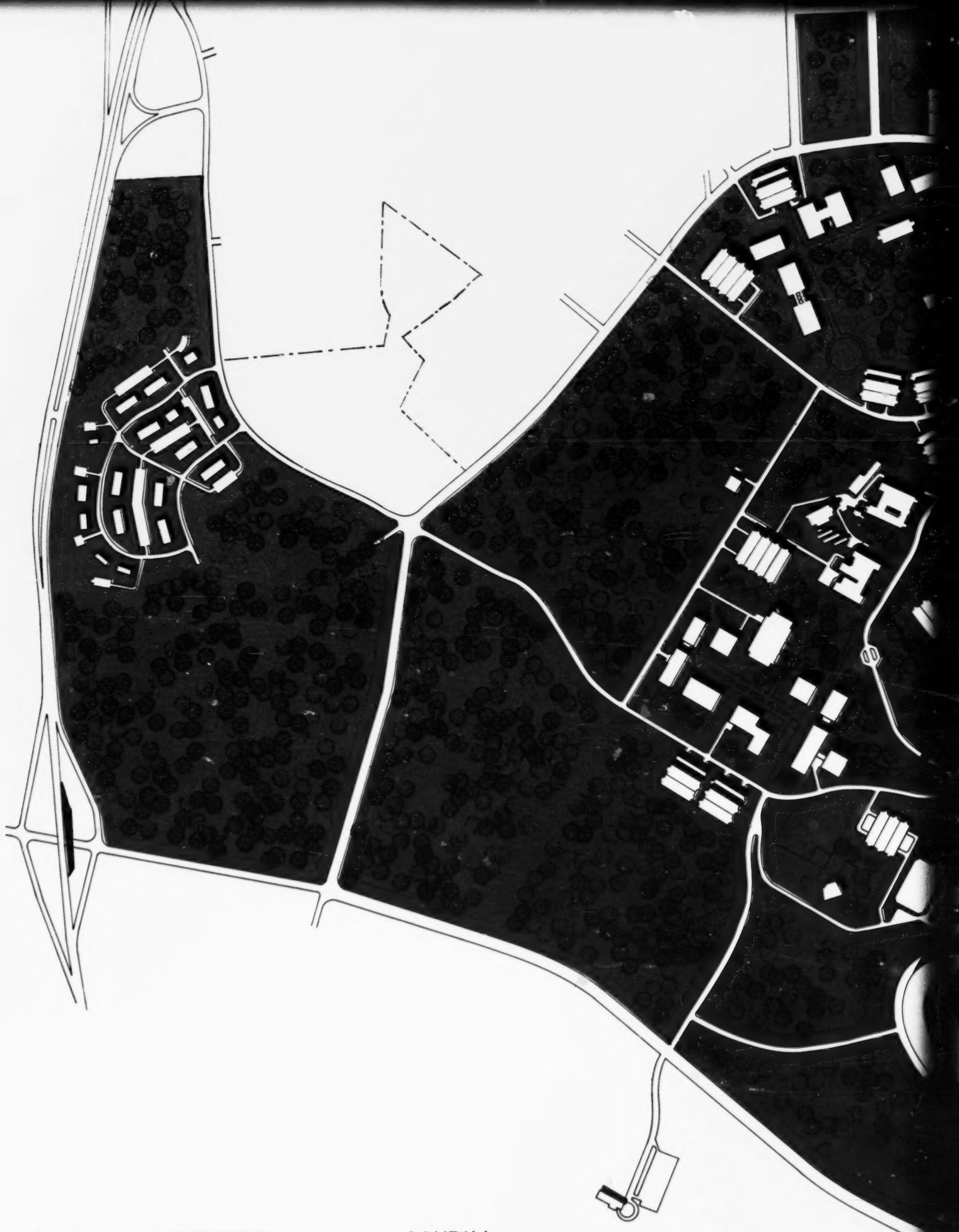
STAGE C, Post 1975

General Academic and Office Space, West, Central, and East Areas	
Additional Science Facilities	
Woman's College Classroom Building	
Engineering Expansion	
Hospital and Clinical Sciences	1,000,000
Housing - Undergraduate Men	
Housing - Undergraduate Women	
Housing - Graduate Students	
Central Administration	
University Center	
Facilities for Research and Institutes	
Medical Staff Housing	
Medical Education Expansion	
Medical Sciences Expansion	



THE PLAN





DUKE UNIVERSITY

DURHAM NORTH CAROLINA

COMPREHENSIVE CAMPUS PLAN

200 400 600 1000 FEET

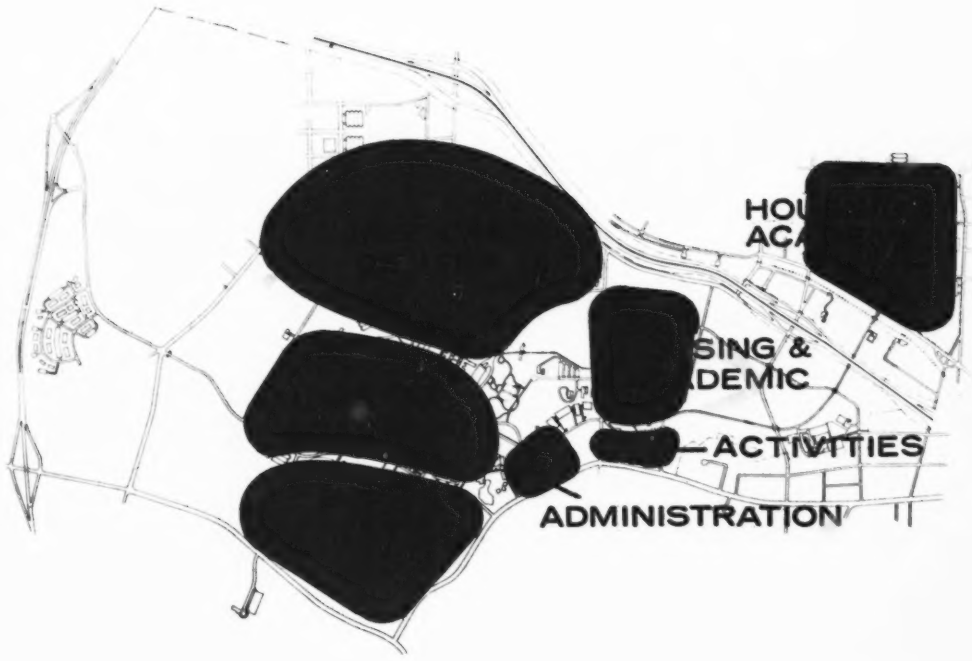
NORTH

CAUDILL
ROWLETT
SCOTT

ARCHITECTS
PLANNERS
ENGINEERS

THE CAMPUS DEVELOPMENT PLAN

A general view of the campus plan appears on the map at the left. This map gives the overall view of building arrangements, landscape character, and basic circulation. The remainder of the report is devoted to detailed explanations of the various elements of the plan.



VIEW LOOKING EAST

BUILDINGS

The designated uses of the buildings shown on the development plan appear in the accompanying table and are keyed by number to the map which follows. The designated uses as shown are assumed valid through 1975 unless noted otherwise under remarks. In some cases, a transition through one or more other functions may precede that shown in the table. The plan represents approximately 20 years of development, or through Stage C. Details of intermediate staging of construction and demolition are described later in the report. The numbering system is based on that now in use with the addition of letters to indicate location in the west, central, east, and medical center areas of the campus. Gaps appear where buildings have been removed. The numbers continue to represent, as best can be determined now, the sequence of construction.

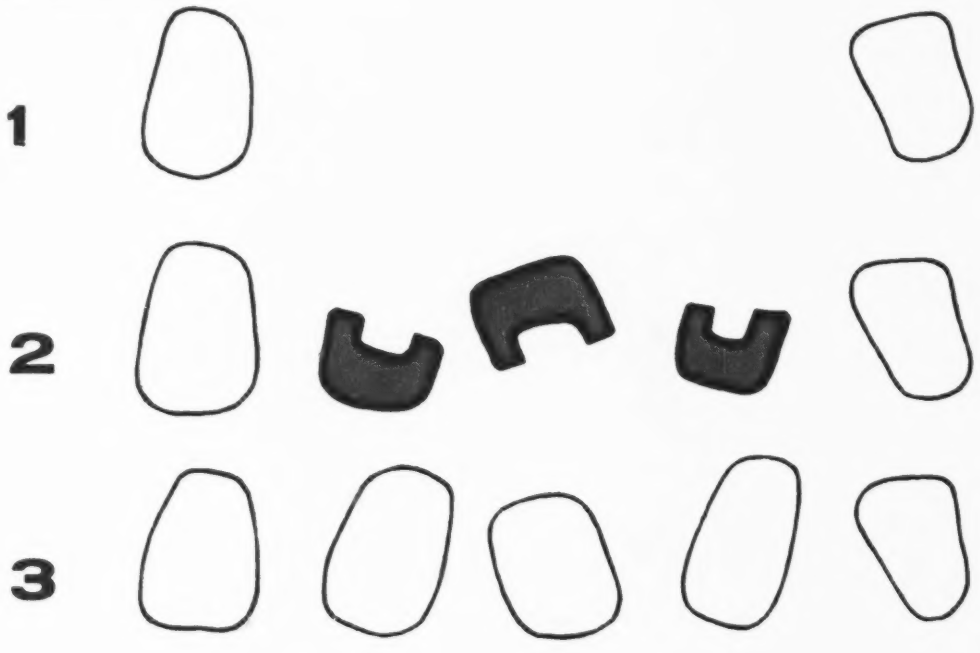
BUILDINGS

No.	Designated Use	Remarks
WEST		
1W	Chapel	
2W	Divinity School	
3W	Department of Religion	
4W	Trinity Library	
5W	Foreign Languages	Possible Library Expansion
6W	Humanities and Social Sciences	English and History 1968 . . .
9W	Humanities and Social Sciences	Psychology and Sociology
10W	Humanities and Social Sciences	Economics and Bus. Adm., ROTC
11W	Undergraduate Men's Housing	
12W	Undergraduate Men's Housing	
13W	Undergraduate Men's Housing	
14W	Student Union	
15W	Student Activities, Services	
16W	Auditorium	
17W	Men's Physical Education	
18W	Stadium	
19W	Alumni House	
22W	Admissions Office	
31W	Greenhouse	
42W	Undergraduate Men's Housing	
43W	Indoor Stadium	
47W	Natural Sciences	Math, Geology 1969 . . .
49W	Natural Sciences	Physics
53W	Humanities and Social Sciences	Administration until 1975. Possibly incl. Foreign Languages and Classical Studies after 1975
55W	Undergraduate Men's Housing	
57W	Natural Sciences	Botany, Zoology, School of Forestry
58W	School of Law	
59W	Garden House	
60W	Undergraduate Men's Housing	
61W	Undergraduate Men's Housing	
62W	Main Library	
63W	Natural Sciences	Chemistry
64W	Men's Physical Education Pool	
65W	Men's Physical Education Courts	
66W	Phytotron	
67W	Accelerator	
68W	Undergraduate Men's Housing	
69W	Dining	

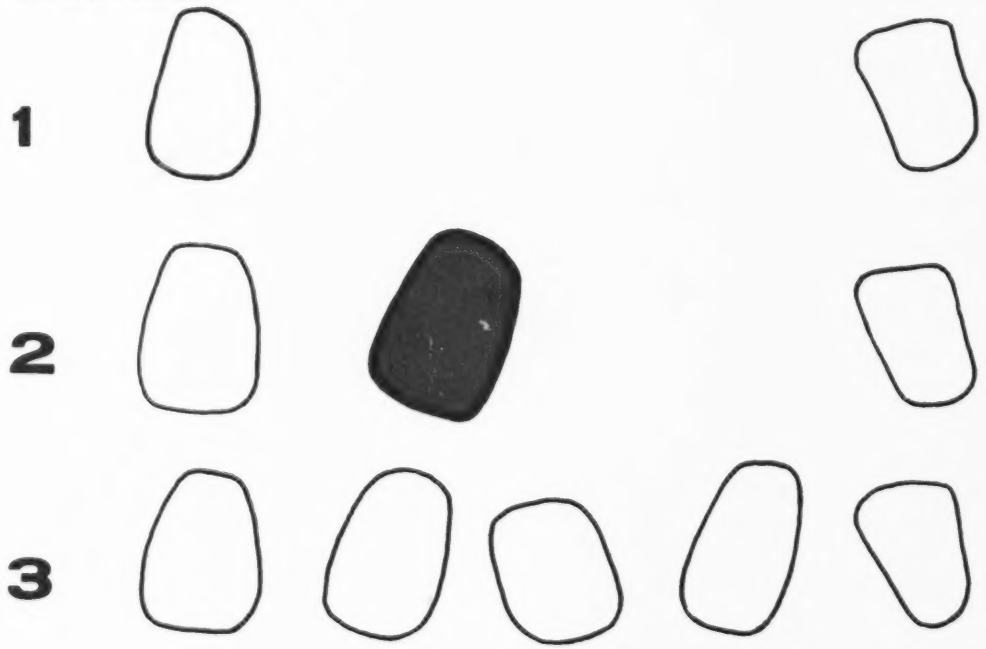
No.	Designated Use	Remarks
70W	Telephone Center	
71W	Divinity School	
72W	Undergraduate Men's Housing	
73W	Faculty Club	
74W	Natural Sciences	Chemistry Expansion
75W	Natural Sciences	Undesignated Expansion
76W	Undergraduate Men's Housing	
77W	Humanities and Social Sciences	Undesignated Expansion
78W	General Academic Space	
79W	Central Administration	Including Duke Press
80W	Research and Institutes	
MEDICAL CENTER		
7M	School of Medicine	
8M	Hospital	
32M	Baker House	
45M	Medical Student Housing	
51M	Medical Student Housing	
52M	Medical Student Housing	
56M	Medical Research	
57M	Main Entry Building	
58M	Clinical Research II	
59M	Medical Sciences I	
60M	Administration and Library	
61M	Medical Education	
62M	Minimal Care Hostel	
63M	Hospital and Clinical Sciences	
64M	Medical Sciences II and Vivarium	
65M	Clinical Basic Sciences	
67M	Hospital and Clinical Sciences	
68M	Staff Housing	
69M	Research and Institutes	
81M	Central Chiller	
P	Parking	
S	Substation	
CENTRAL		
1C	Hospital Laundry	
2C	Service Center	Offices
3C	Service Center	Shops
4C	Service Center	Warehouse

No.	Designated Use	Remarks
5C	College of Engineering	
6C	Graduate Student Housing	
7C	Graduate Center Commons	Dining, Activities
8C	Graduate Student Housing	
9C	Graduate Student Housing	
10C	Graduate Student Housing	
11C	Campus Commons	Snacks, Activities
12C	Recreation Facility	Covered, Not Enclosed
13C	Performing Arts Hall	3,000 Seats
14C	University Center	Activities, Conferences
15C	Graduate Student Housing	
16C	Graduate Student Housing	
17C	Graduate Student Housing	
0C	Religious Centers	
EAST		
1E	Administration, Woman's College	History, English until space required by administration
2E	Humanities and Social Sciences	English, History, Philosophy
3E	Undergraduate Women's Housing	
14E	Humanities and Social Sciences	
15E	Undergraduate Women's Housing	
16E	Woman's College Library	
17E	Undergraduate Women's Housing	
18E	Undergraduate Women's Housing	
19E	Baldwin Auditorium	
20E	Undergraduate Women's Housing	
21E	Undergraduate Women's Housing	
22E	Dining	
23E	Undergraduate Women's Housing	
24E	Humanities and Social Sciences	Department of Education
25E	Undergraduate Women's Housing	
30E	Undergraduate Women's Housing	
51E	Physical Education	Faculty Offices
52E	Undergraduate Women's Housing	
53E	Undergraduate Women's Housing	
55E	Undergraduate Women's Housing	
56E	Arts Center	Music
57E	Physical Education	
58E	Student Center	
59E	Arts Center	Art
60E	Undergraduate Women's Housing	
61E	Undergraduate Women's Housing	
62E	Humanities and Social Sciences	
63E	Undergraduate Women's Housing	
64E	General Academic and Office Space	

PROBLEM



SOLUTION



CONCEPT: THE UNIFIED CAMPUS

The overriding objective of the campus plan is to reinforce, in physical form, the unity of the total University. To this end all possible future development is planned between the existing eastern and western limits of the campus, and much of it in the central area. At the same time attempts have been made to bolster the identity of the undergraduate colleges, notably with academic reinforcement of the Woman's College and the location of the new College of Engineering complex in the central campus area.

Whenever possible, future projects which will involve the total University are located in the central area to maximize the interaction among students of all the colleges and the professional schools. This process will not have a great immediate effect because of existing commitments, but in the long range the center of activity will tend to shift from the ends to the center of the campus.

The diagram illustrates a linear linkage of major activities in the central area. Actual development will be staged to cross these land uses at 90° in order to achieve a mixture of activities and to allow development of meaningful building groupings, rather than stringing isolated buildings along Campus Drive. This will retain the system of "quadrangles" which leads to desirable campus spaces instead of isolated building sitings such as exist along Science Drive, cited as a problem earlier in this report.

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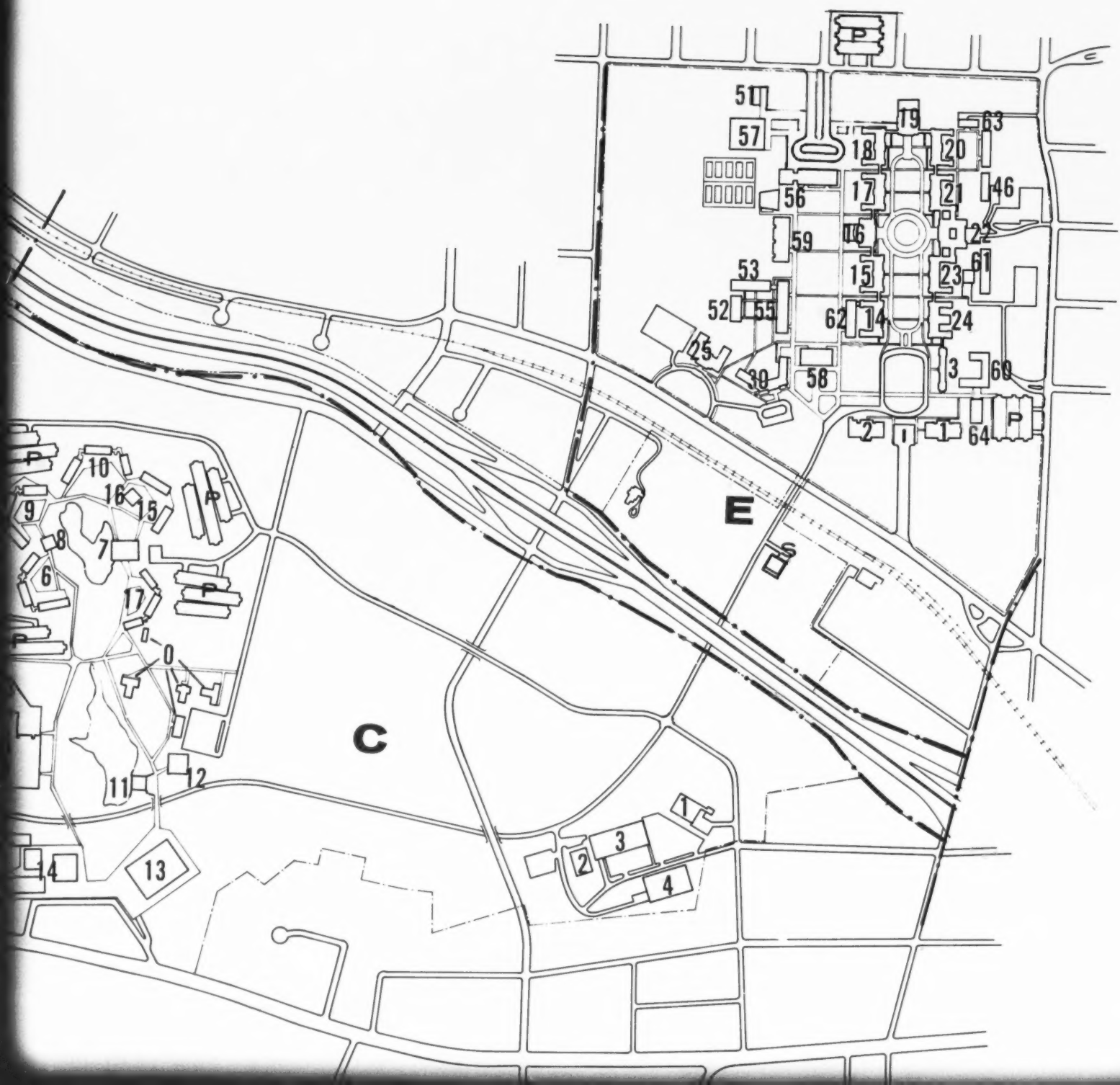

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DUKE UNIVERSITY

DURHAM NORTH CAROLINA

COMPREHENSIVE CAMPUS PLAN

200 400 600 1000 FEET

NORTH

CAUDILL
ROWLETT
SCOTT

ARCHITECTS
PLANNERS
ENGINEERS

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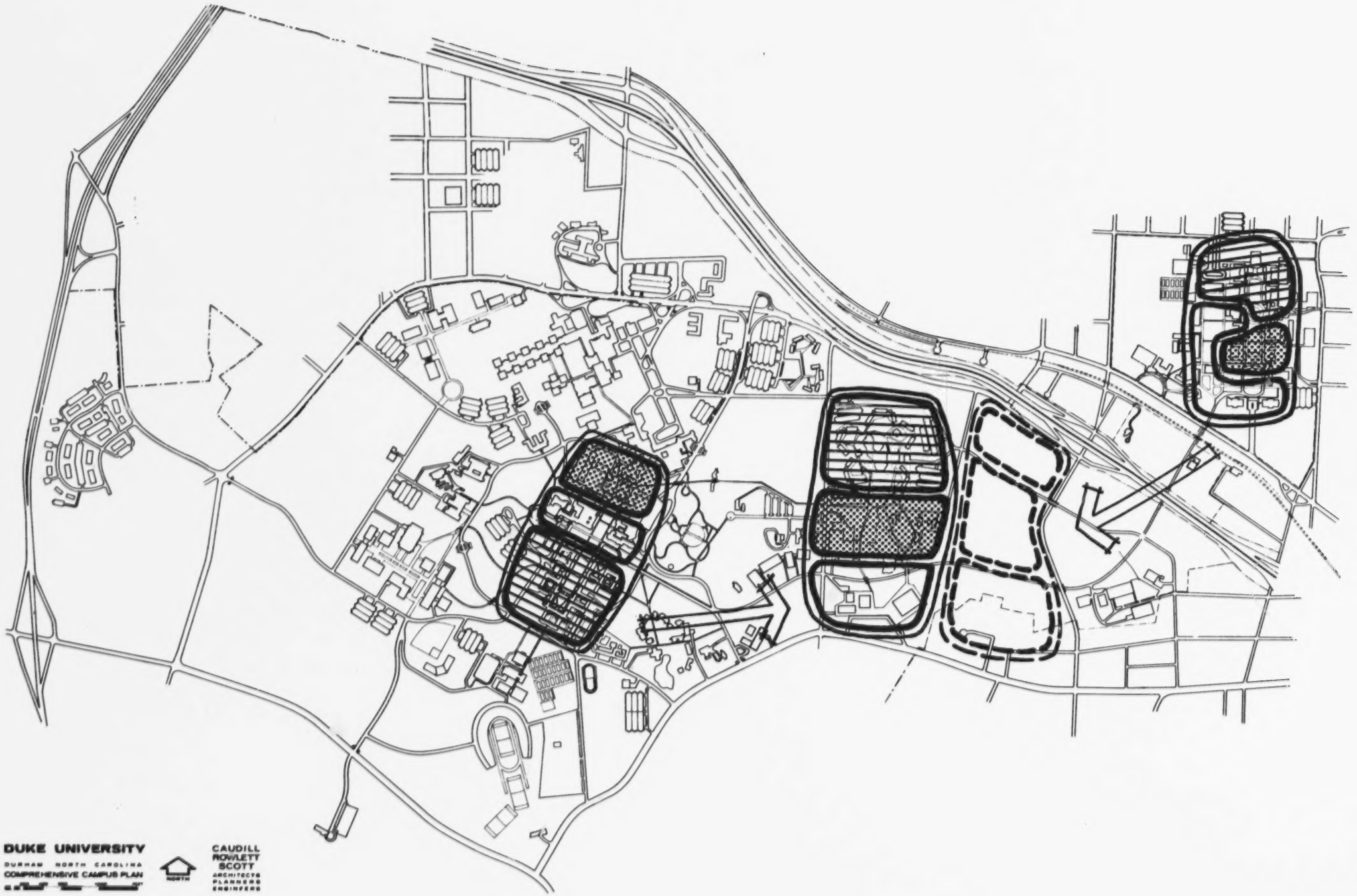
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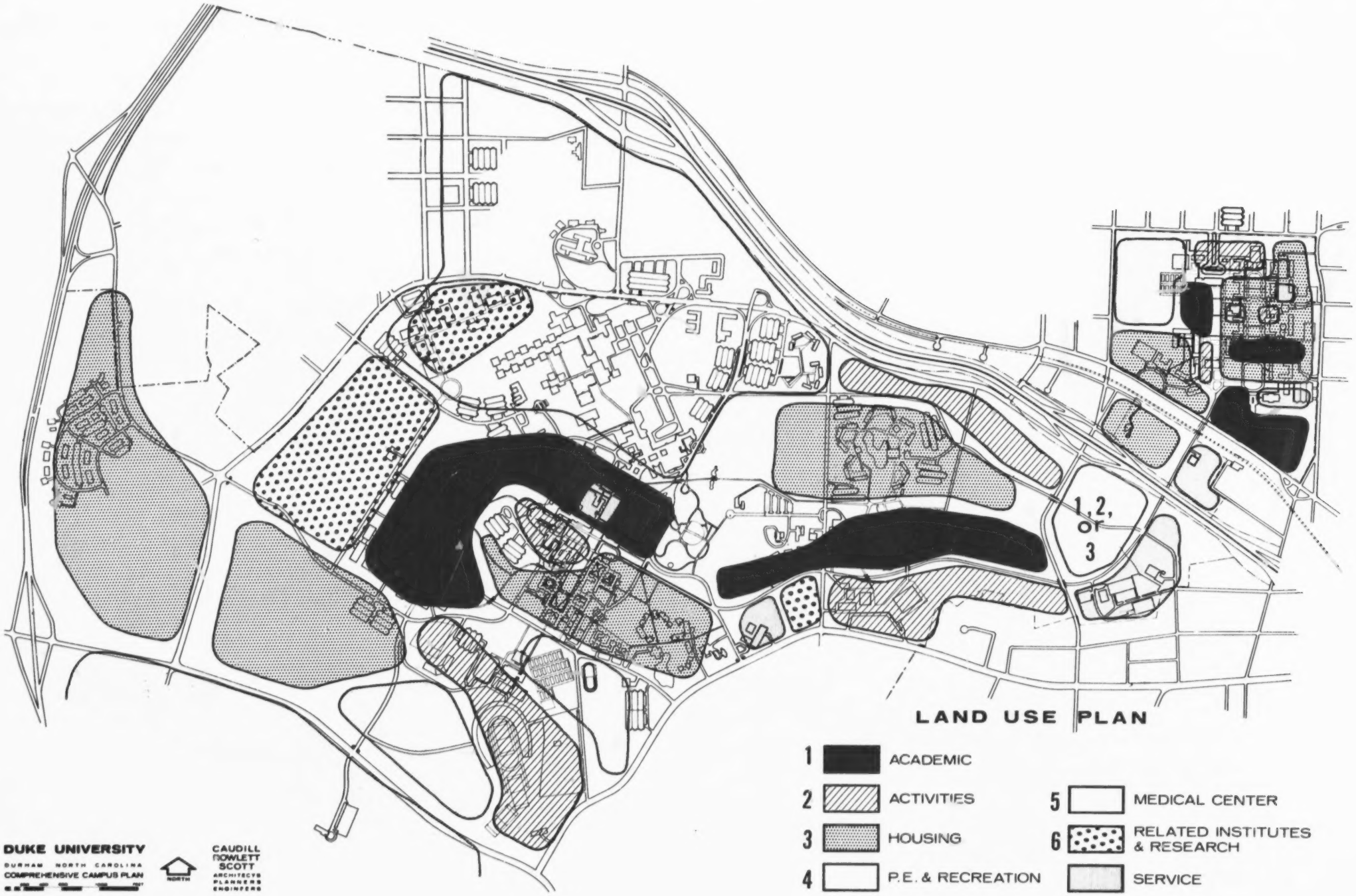
PLANNERS
ENGINEERS

LAND USE

The land use plan is the basic foundation for development. It establishes the framework within which flexibility of future building sizes and locations can occur. This does not mean that it should be considered a rigid zoning plan; circumstances may well justify occasional mixtures of land use. The plan should be regarded as a guide for logical growth. Seven general categories of use are shown. In general, academic uses are kept to the interior, and housing and activities which tend to be used by both the University and the public are on the exterior of the campus. This will help to achieve a separation of campus and urban traffic.

Three of the general categories may require further explanation. ACTIVITIES include student centers, Chapel, major auditoria, and varsity athletics. All of these will involve the off-campus public to some degree and have particular requirements for vehicular access. SERVICES include central administration, libraries, and student health facilities as well as physical plant development and service facilities. RELATED INSTITUTES & RESEARCH allows for a wide variety of activities, but the largest land users will be connected with the Medical Center and scientific research.

The existing land uses are shown at the left. The basic difference between the arrangements on east and west is that housing and academic activities are mixed on the east and separated on the west. The location of academic uses on the west illustrates the problem of dispersal.



LAND USE PLAN

1 ACADEMIC
2 ACTIVITIES
3 HOUSING
4 P.E. & RECREATION
5 MEDICAL CENTER
6 RELATED INSTITUTES & RESEARCH
SERVICE

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COMPREHENSIVE CAMPUS PLAN

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ACADEMIC DISCIPLINES

The basic arrangement of academic disciplines is superimposed over the plan at right.

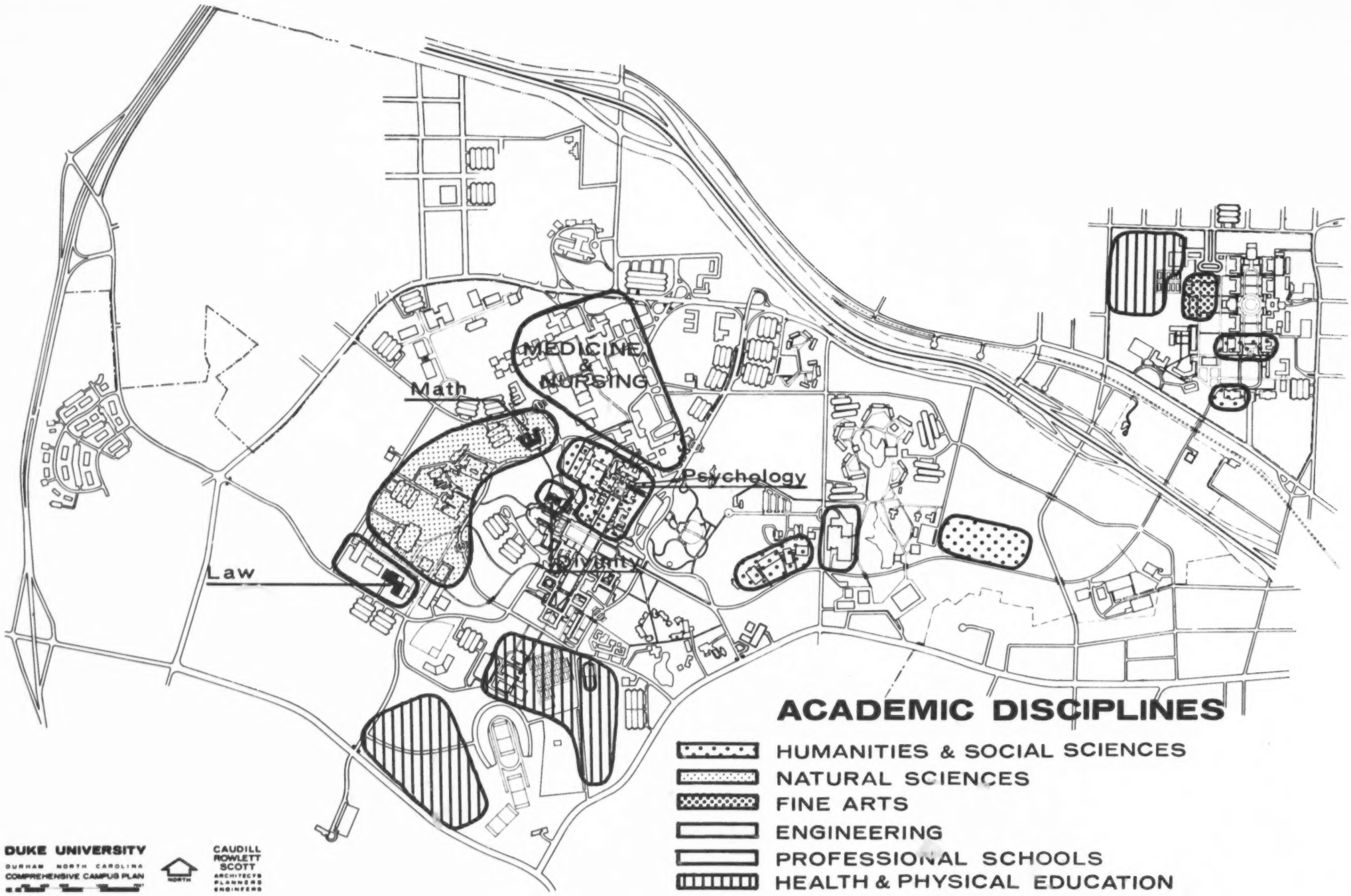
The humanities and social sciences are dispersed throughout the campus. These disciplines utilize the most general types of instructional space and offer the greatest opportunity for academic unity of the total University through interdisciplinary use of space. These areas will also be the most subject to change in departmental use from year to year; thus pinning such a discipline down to a certain building is meaningless over a 20-year period. However, two specific plans for use of space, as now foreseen by the administration, have long-term implications. It is now planned to house mathematics and geology in the present Engineering Building when it is vacated in 1968. It is reasonable to assume that mathematics will continue to expand in that location as a logical link between the humanities and the natural sciences. Psychology also occupies a similar position relative to the social sciences and medicine.

In the interest of academic unity most of the humanities and social sciences could be taught throughout the campus no matter where their departments might be headquartered. This could apply to mathematics as well.

The natural sciences are considered anchored to their western location by virtue of their commitment to expensive specialized facilities. This has run counter to the geographic unity of the University. In this regard, advantage might be taken of the opportunity to teach general lecture courses (and those to which electronic techniques may be applied in the future) in the central and east areas of the campus.

The proposed Fine Arts Center will help anchor the eastern end of the academic campus and provide additional intellectual stimulus for the Woman's College in its involvement at all levels of the University's program. The opportunity may later be taken to use facilities in the central area for some exhibits and performances.

The professional schools, including the College of Engineering, will experience varied and somewhat unpredictable growth. The building groupings shown on the plan allow two methods of expansion: either with additions to existing disciplines at their present location, or by moving to new locations and reassigning existing space. The College of Engineering will move to the new central campus location. It is assumed that Divinity, Law, and Forestry will expand into additional buildings at their present locations. In the long future all professional schools could be shifted to other locations if their programs and other events so indicate.


MEDICINE
&
NURSING
Math
Psychology
Law
University
ACADEMIC DISCIPLINES
HUMANITIES & SOCIAL SCIENCES
NATURAL SCIENCES
FINE ARTS
ENGINEERING
PROFESSIONAL SCHOOLS
HEALTH & PHYSICAL EDUCATION
DUKE UNIVERSITY
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STUDENT HOUSING

The plan encompasses five housing areas for students. Four of these are expansions of existing housing, and the fifth will be added to satisfy a serious deficiency of housing for single graduate students. From left to right on the map, these are:

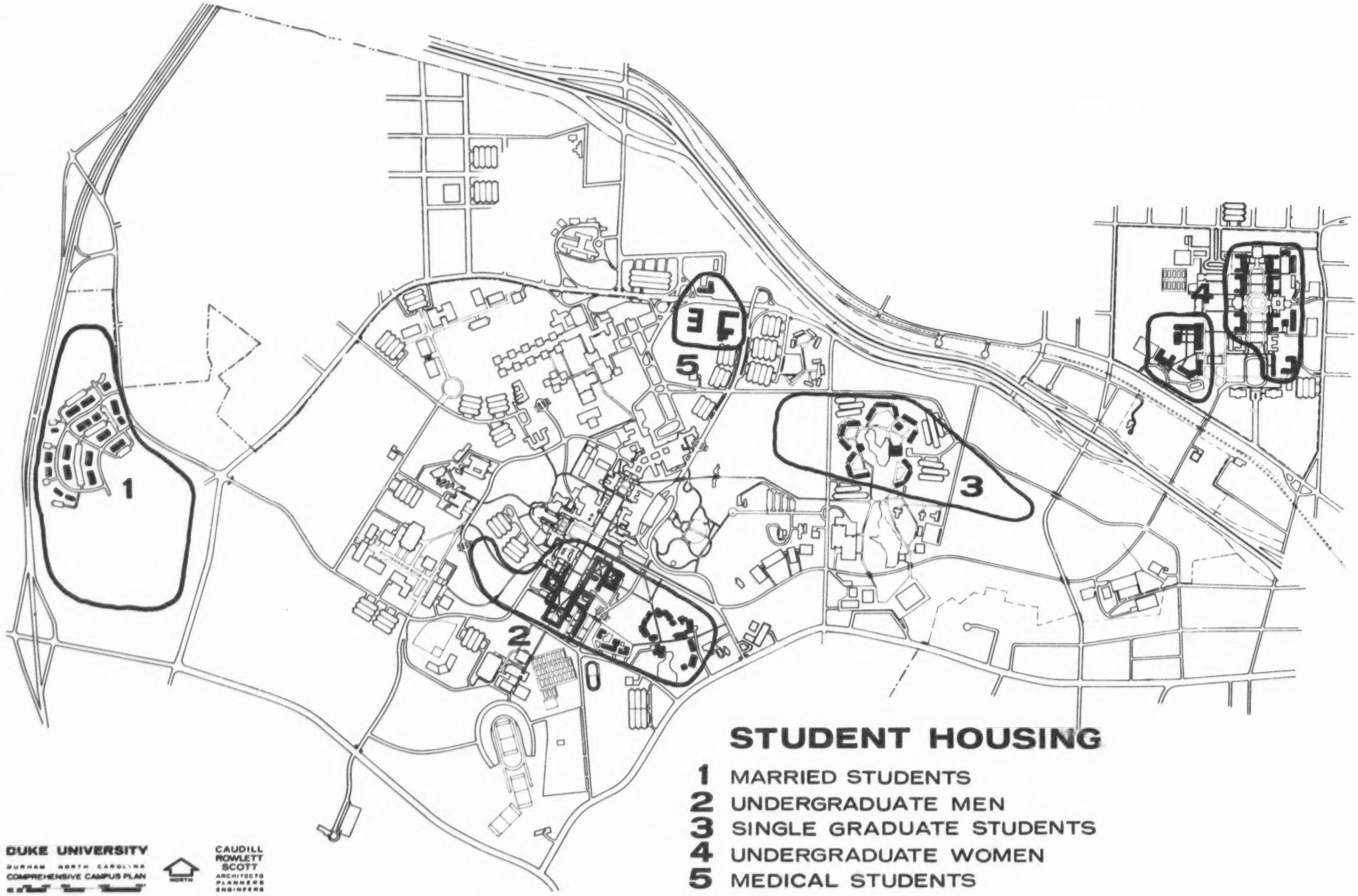
1. Married Students: The University now operates 224 apartments for married students. It is anticipated that this number will double during the next ten years. The actual number required will vary depending on future policy and the extent to which private developers supply the need. Since the plan will encourage most other campus development to occur in areas to the east of the present science area, a generous amount of land has been left for expansion of married student housing. Present uses of parts of this area for scientific experiments can remain for many years, unless an unforeseen demand for housing arises.

2. Undergraduate Men: This is the Trinity College residence area. No change is anticipated in the policy of also housing single men of the Engineering College in this area. The residence halls in the Gothic quadrangle will house 1,964 men when the current renovation program is complete. The units upon which construction has begun in the valley east of the existing parking lot will accommodate 833 men upon completion as now programmed. A further increment of expansion is shown in the location of the parking lot. It is proposed that these residence halls be constructed on a plaza base above three levels of parking structure. These buildings and their plaza will form a pedestrian link between the old and new residence halls. The number of beds to be provided has not been programmed, but the buildings could be varied in height to accommodate up to approximately 800 students.

3. Graduate Students: 500 units for men and 100 for women are programmed for construction in approximately five years. The plans show expansion for an equal number but this density could be increased if demands warrant. The site offers fine design potential on two sides of a wooded ravine. A small lake could be developed as a part of the setting. The program calls for dining and commons facilities to complete the center.

4. Undergraduate Women: Housing for the Woman's College can expand in two areas. 348 beds are planned in three units which will complete a court which is now partly formed by Southgate and Gilbert-Addoms Halls. This group could be designed to allow additional units. Additional courtyards may be formed to the east of the original mall by locating new residence halls there. If conditions should warrant further expansion it might utilize part of the southeast corner of that campus.

5. Medical Students: The three buildings which now house the School of Nursing and men graduate students will probably be renovated to serve nursing or medical students or both upon completion of the new Graduate Residence Center. Detailed programming for their use has not been completed. The decision as to whether nursing students will continue to live here or will move to the Woman's College has yet to be finalized at this writing.



STUDENT HOUSING

1 MARRIED STUDENTS
2 UNDERGRADUATE MEN
3 SINGLE GRADUATE STUDENTS
4 UNDERGRADUATE WOMEN
5 MEDICAL STUDENTS

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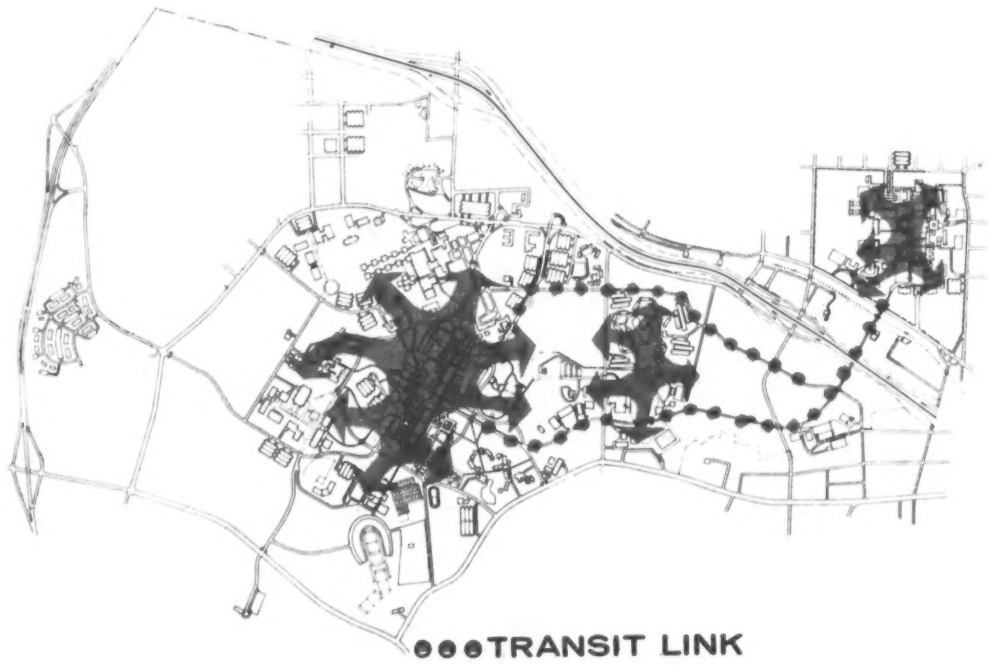
CIRCULATION

The circulation plan is based on maximum reduction of pedestrian-vehicle conflicts, and development of a sophisticated transit system to reduce automobile traffic and unify the pedestrian sub-campuses.

The large area of the campus will make it impractical to completely eliminate dissection by urban streets. However, urban traffic should be confined to Anderson Street, Swift Avenue and Main Street within the campus. Four traffic lanes with medians and left turn lanes should be developed on the major urban loop consisting of Erwin Road, Swift Avenue, Duke University Road and Highway #751. The new Swift-Maplewood connection should overpass Campus Drive without interchange of traffic.



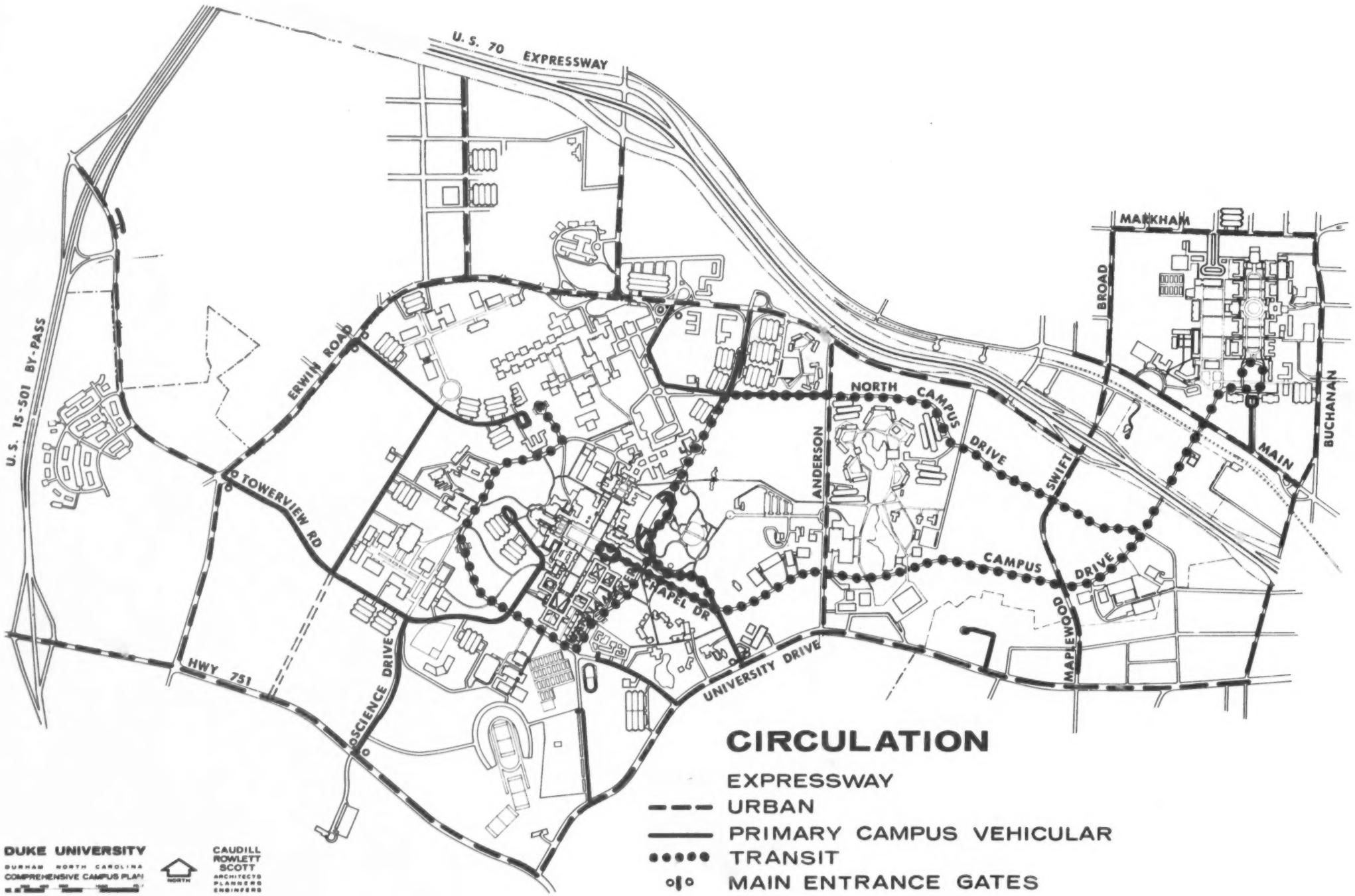
●●●TRANSIT LINK

Cross traffic must be eliminated by closing and rerouting campus streets as shown on the plan. The system is one of penetration to major campus destinations from the perimeter urban streets.

The ultimate development of an improved transit system on Campus Drive, a proposed North Campus Drive, and the interior streets of the west area is strongly recommended. As this system is developed, general automobile traffic should be withdrawn from these routes. A genuine improvement of the campus environment will result, along with the elimination of needless congestion and hazards from the heart of the University. The eventual use of a quiet electric vehicle may be feasible as the campus is converted to all-electric power for heating and cooling.

Wannamaker Drive is closed in the interest of pedestrian access from the new men's residence halls to the campus. An underpass is proposed under Chapel Drive to facilitate transit circulation. Many of the streets proposed for closing can be redesigned as major pedestrian walks serving new building groupings.

Several stages of "auto withdrawal" could be planned. Control could be achieved with card-actuated gates located at key points of access. The gates could be weight-actuated to accommodate buses and heavier service vehicles. Visitors could be issued cards at the main entrance gates or be accompanied by porters. Deliveries from off-campus would go to the service center. If direct delivery is then required a gate card could be issued or an employee could accompany the delivery vehicle. As interior streets and parking lots are replaced by improved perimeter facilities, gate cards could be withdrawn until the most practical limitation of vehicular traffic is achieved.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BUCHANAN
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ERWIN ROAD
TOWERVIEW RD
HWY 751
SCIENCE DRIVE
CHAPEL DR
NORTH CAMPUS DRIVE
ANDERSON
SWIFT
CAMPUS DRIVE
MAPLEWOOD
UNIVERSITY DRIVE
CIRCULATION
EXPRESSWAY
URBAN
PRIMARY CAMPUS VEHICULAR
TRANSIT
MAIN ENTRANCE GATES
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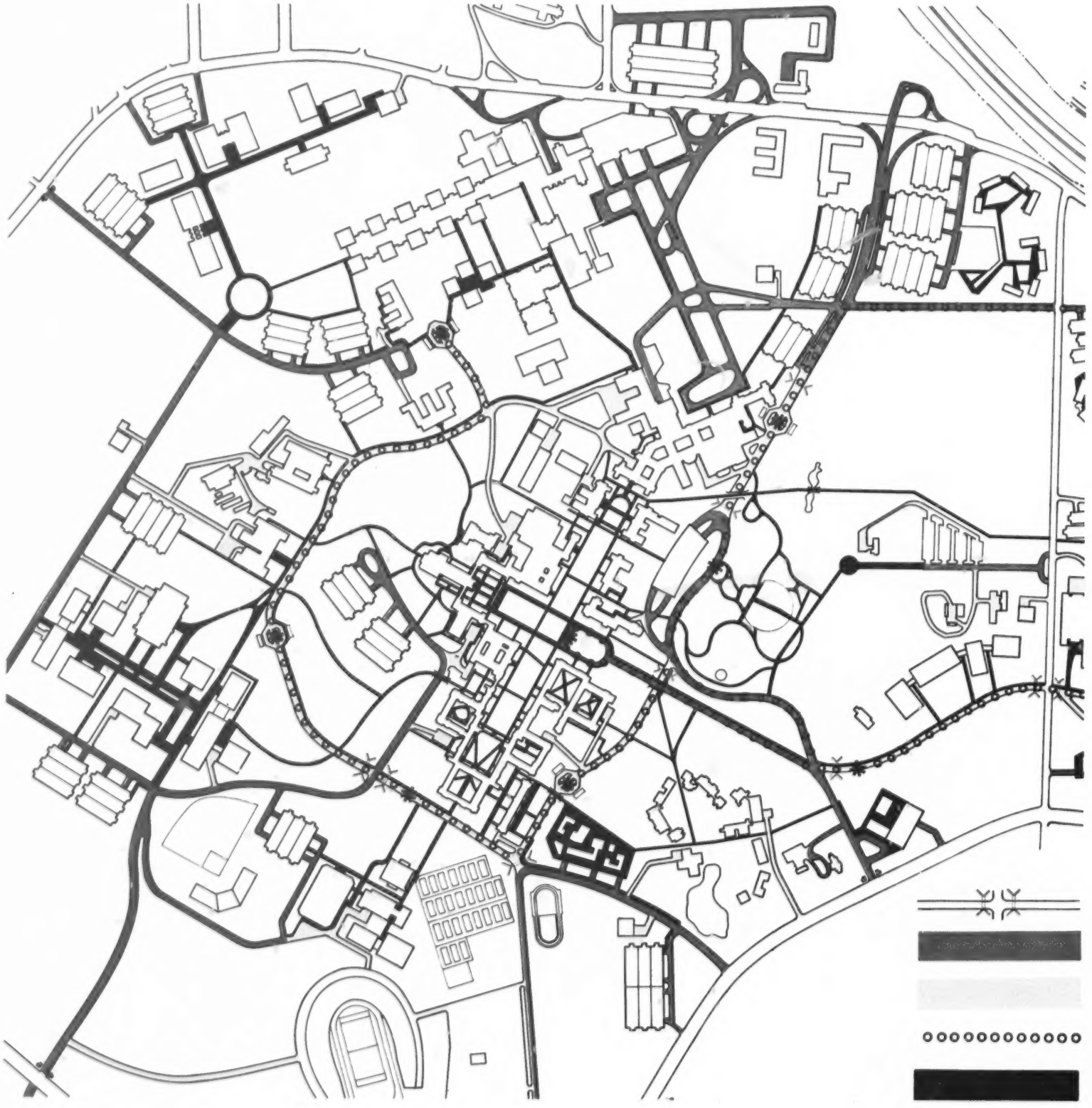


CONTROL GATES

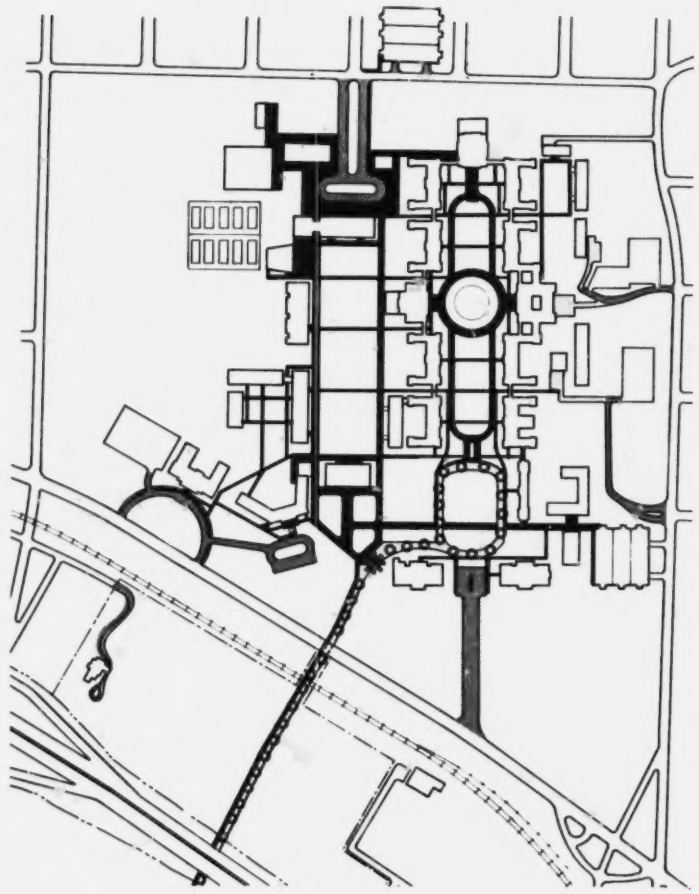
GENERAL USE

LIMITED USE AND SERVICE

TRANSIT

WALKS

The circulation plan is shown here at a larger scale to provide more detail regarding pedestrian walks, transit stops, and service access. The walks shown should receive primary emphasis both for capacity and appearance. It is hoped that they will be surfaced with slate or blue stone pavers to establish design unity throughout the campus. Most additional walks could be treated as secondary paths of a more informal nature, surfaced with concrete, asphalt, or gravel. Major transit stops are designated. These should receive special treatment such as extra stopping lanes and covered waiting areas. The basic routes could be expanded upon demand to complete a loop through the medical center, connect medical center development north and south of Erwin Road, and serve the married student housing area. It might also prove efficient to connect Campus Drive and North Campus Drive via Anderson Street.



The limited use streets can be opened as needed to expedite access and egress for special events such as football games, the semi-annual moving into residence halls, and ceremonies in the Chapel.

It is recommended that most movement between east and west be by transit. This will save the time of hunting for parking spaces, and allow removal of parking lots on the south part of the Woman's College campus. These lots disrupt the unity of the campus by imposing an "alien" use in an important academic and activity area. With a few key improvements to the perimeter urban streets, automobile access should be fully as convenient as that on the west.

PARKING

It has often been said that a university is an organization of professors with a parking problem. And it is true that many, if not most, university presidents, when asked what their most pressing problem is reply, "Parking." Your planners are well aware that parking is an important consideration and that it is important not only to professors but also to staff, students, and visitors.

The parking plan for Duke employs garage structures to a high degree. In spite of the cost of structures, it is felt that their use is justified for the following reasons:

1. Surface lots are wasteful of land and trees, and especially so in the rolling, forested topography of Duke.

2. Surface lots create large "non-use" areas which are an obstacle to pedestrian movement and effective land use.

3. The parking problem must be solved, but maintenance of a wholesome and inspiring academic environment must take precedence.

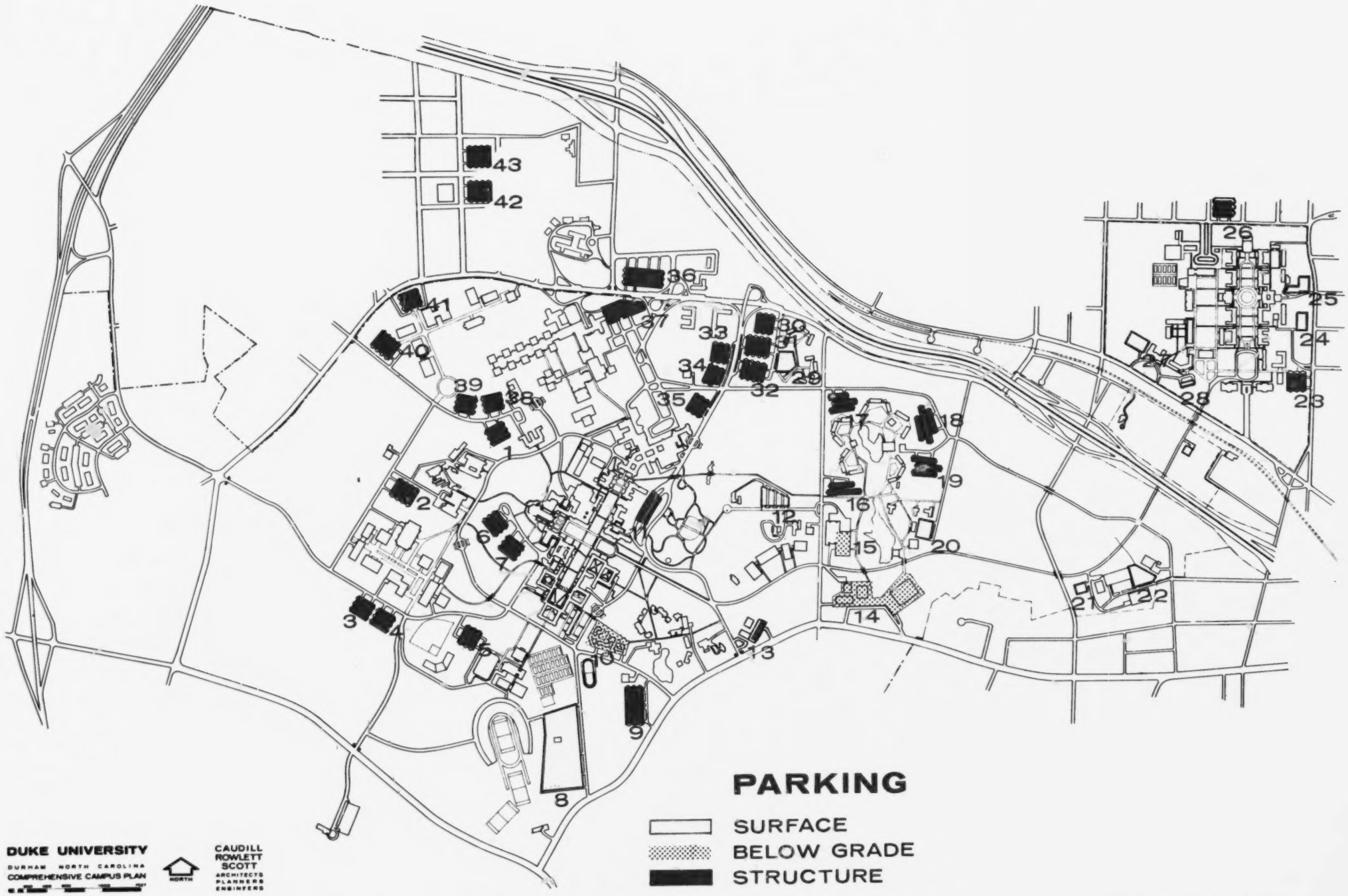
4. Parking structures can be handsome architecture and take some of the sting out of the masses of parked cars by appearing as buildings rather than as parking lots.

5. The architecture of parking garages offers an additional opportunity to achieve campus unity, through consistent design as a single building type.

Theoretical parking demands were calculated for the year 1975. A detailed explanation of the projections appears in the appendix. It is hoped that duplication of parking spaces on various parts of the campus will be eliminated through effective development and use of the campus transit system. The transit system will also make it feasible to use parking areas required for the stadium and public facilities in the central area for both commuter students and visitors.

Projected Parking Demand

Zone	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total
Demand	1315	2452	158	0	7000	100	1652	636	0	600	634	126	688	145	15,506



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DURHAM NORTH CAROLINA
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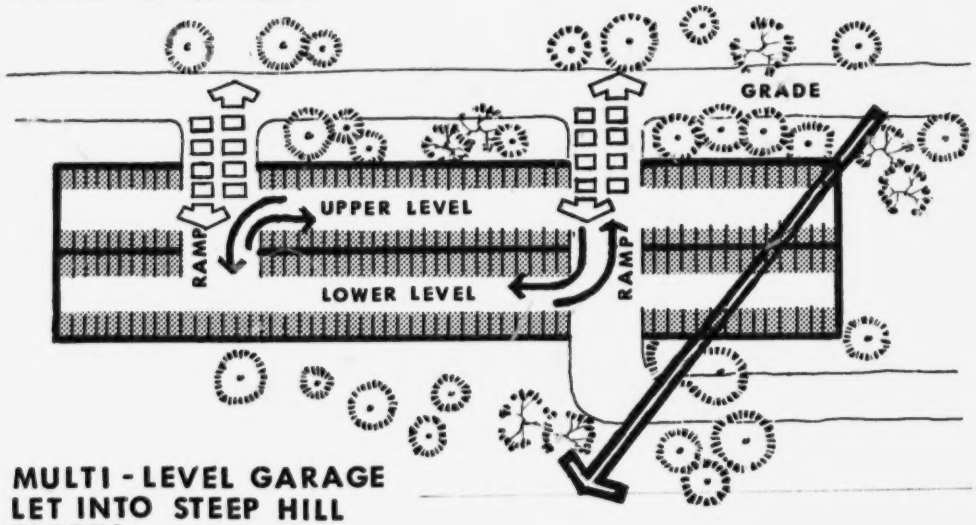
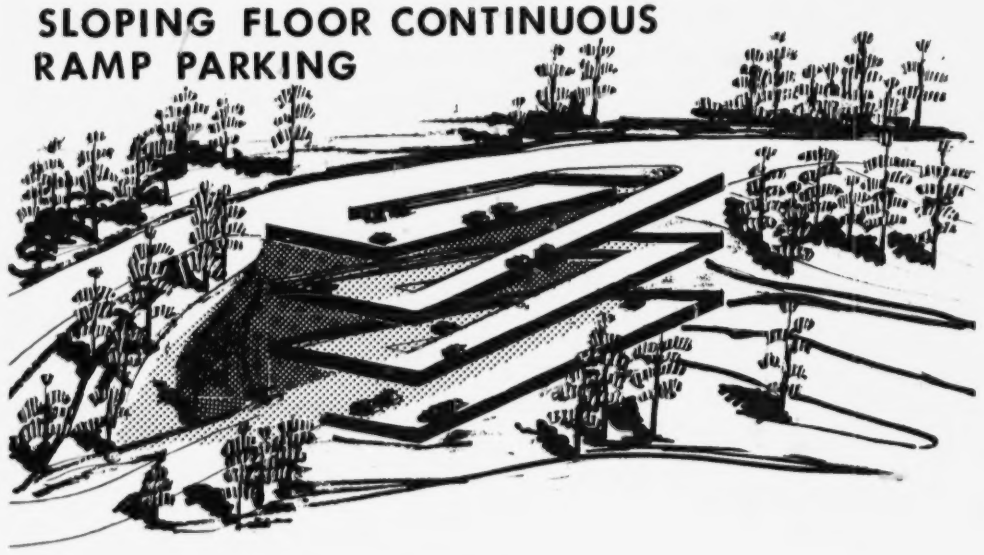
Facility	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	Total
Capacity	384	360	360	360	360	360	360	850	720	600	280	106	200	850	50	288	252	360	252	50	50	110	360	72	83	504	94	15	100	324	576	576	324	324	324	648	920	324	324	576	324	576	576	15,506

STRIP GARAGES



MULTI-LEVEL GARAGE LET INTO STEEP HILL SLOPES

SLOPING FLOOR CONTINUOUS RAMP PARKING



PARKING STRUCTURES

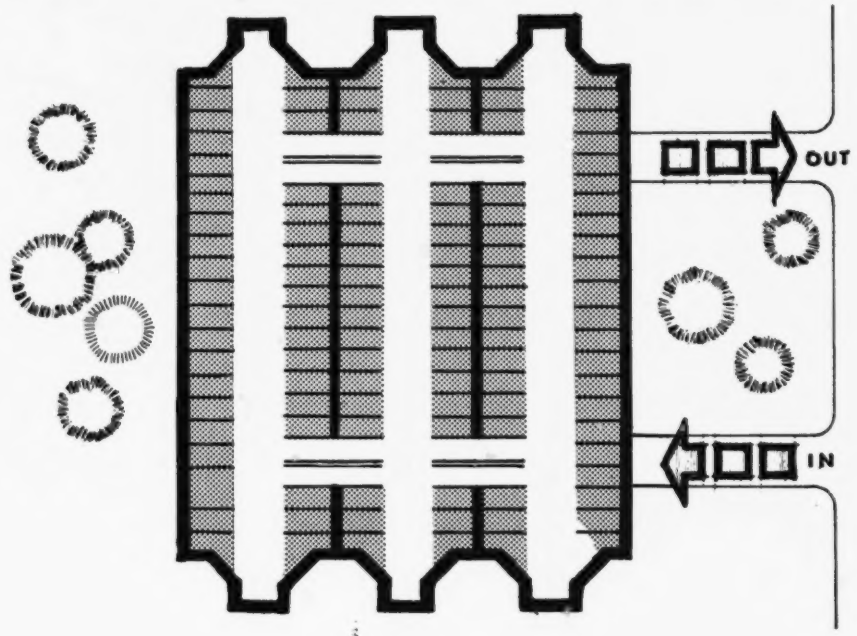
The rolling topography at Duke offers numerous opportunities to construct parking structures with a minimum of landscape desecration. In many cases, garages built against slopes could also gain access from different levels, minimizing requirements for ramps between levels.

The examples at the left indicate two ways in which strip garages could be built against a steep slope. Where there is limited access to the structure a flat floor with separate up and down ramps, as shown in the top two sketches at left, will offer the most efficient traffic movement. Where access can be achieved from several streets at different levels a continuous ramp, as shown at bottom left, will probably be more economical. This type is not so efficient in moving traffic.

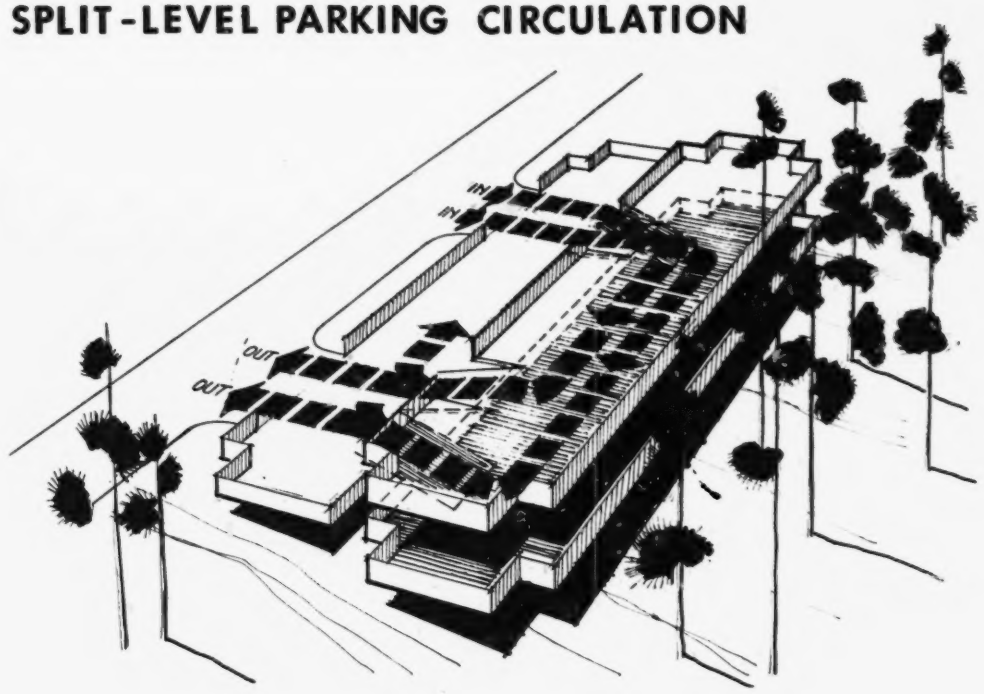
The importance of consistent and sensitive architectural design of parking structures must not be overlooked. A wide variety of garage types will become a disruptive rather than a unifying design influence on campus. The form repeated on the parking plan and enlarged in the sketches at right represents one possible approach utilizing repetitive split level units in various combinations which adapt to the topography and demand.

The choice of a strip or modular unit garage should depend on detailed analysis at each site. In some cases, i.e., possibly at #6 and #7 on the plan, a strip garage might be favored. This certainly appears to be the most natural solution east of the Allen Building. Whichever type structure is developed, design unity in form and materials should be pursued.

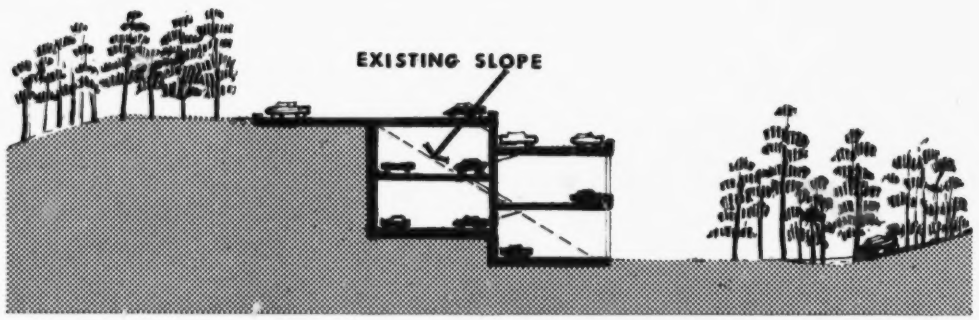
TYPICAL PARKING UNITS
AVERAGE of 36 SPACES/UNIT & 374 SF/SPACE



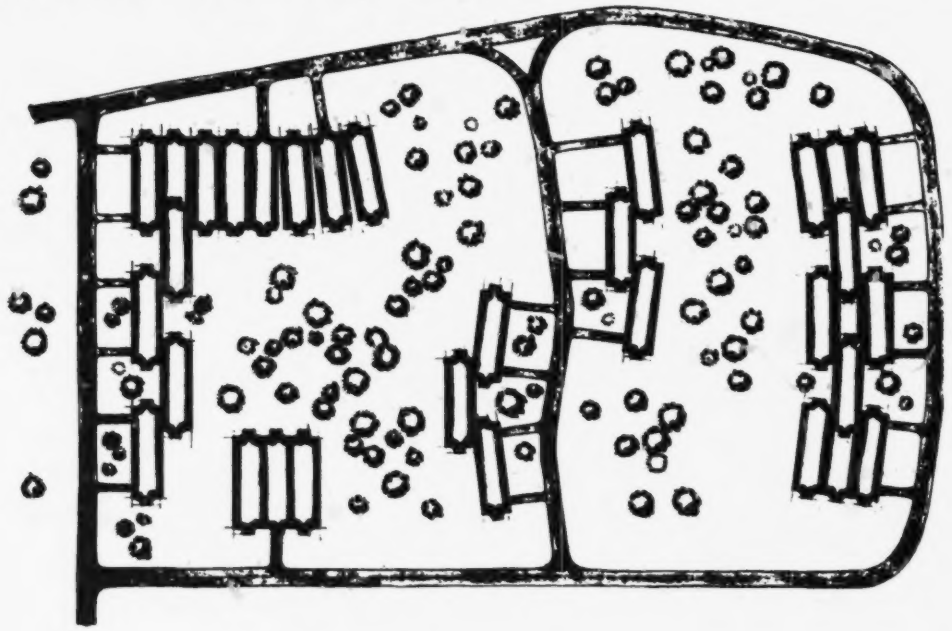
SPLIT-LEVEL PARKING CIRCULATION

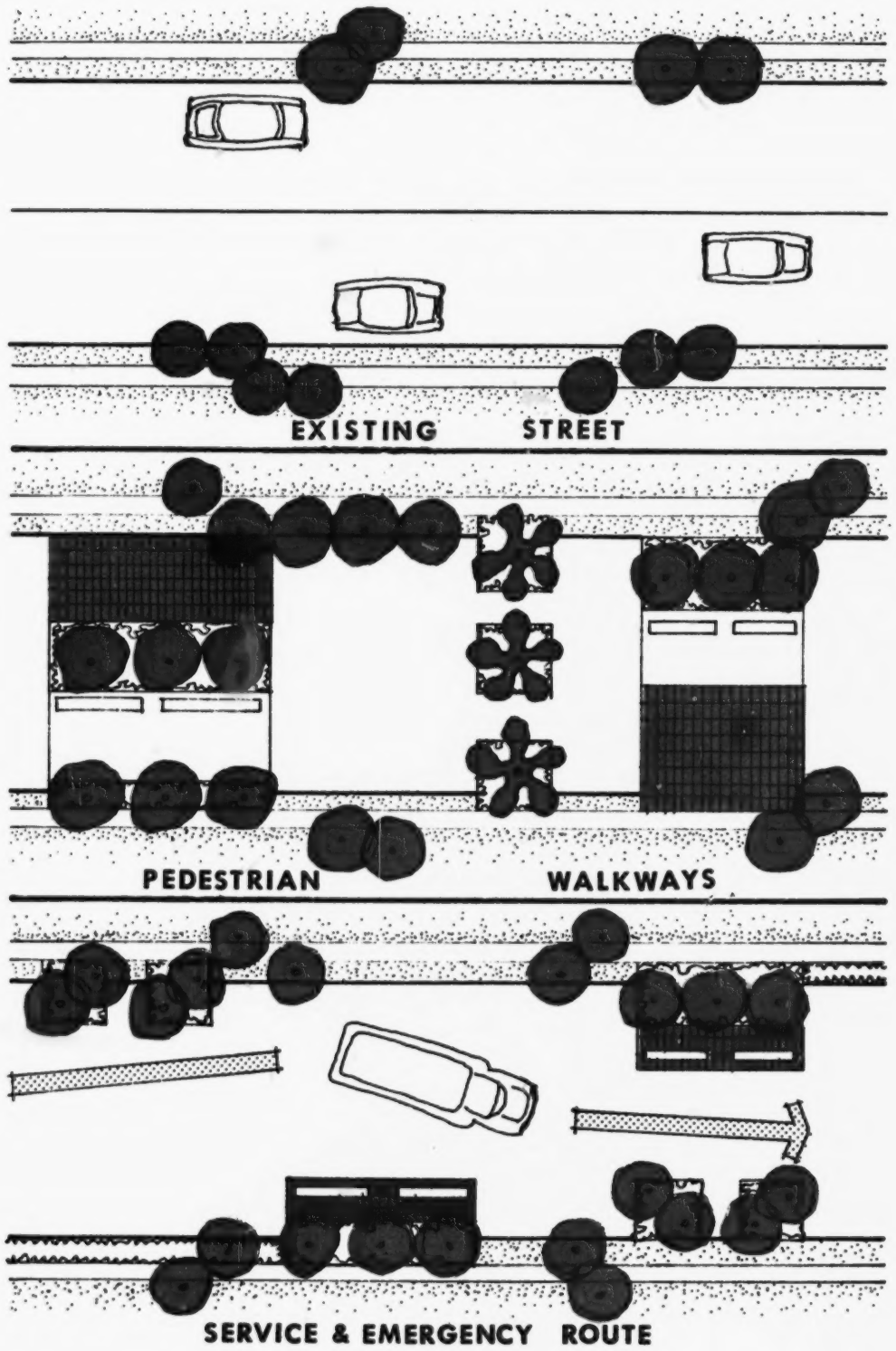


SITE ADAPTABILITY



VARIABLE UNIT COMBINATIONS





SERVICE ACCESS

Successful development of the pedestrian campus will require major modifications to the servicing systems. The basic new ingredient required is the development of major pedestrian walks designed for double duty for small service vehicles. These walks can be designed and converted from existing streets to retain a pedestrian character and accommodate vehicles up to the size of a pickup truck. Many new kinds of smaller vehicles have been developed and are seeing increasing use on many campuses. The use of electric power may offer a unique opportunity at Duke for charging battery-operated vehicles during nighttime when regular loads are reduced.

Several existing streets which will be closed to general automobile use may be retained for both transit and service use as shown on the circulation and service access plans. Their entrance points may be controlled with card-actuated gates, combined with treadle-actuated controls for the heavier transit vehicles.

The plan shows the principal service routes. Many minor routes for small scale service vehicles can be developed within this major framework.

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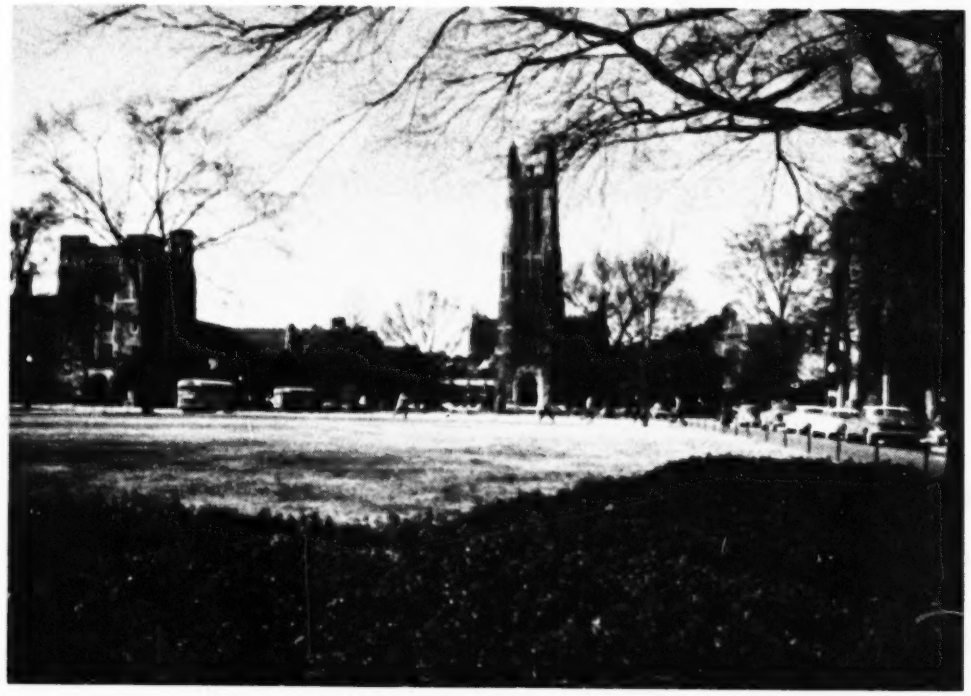
SERVICE ACCESS

SERVICE STREET

SERVICE VIA PEDESTRIAN WALK



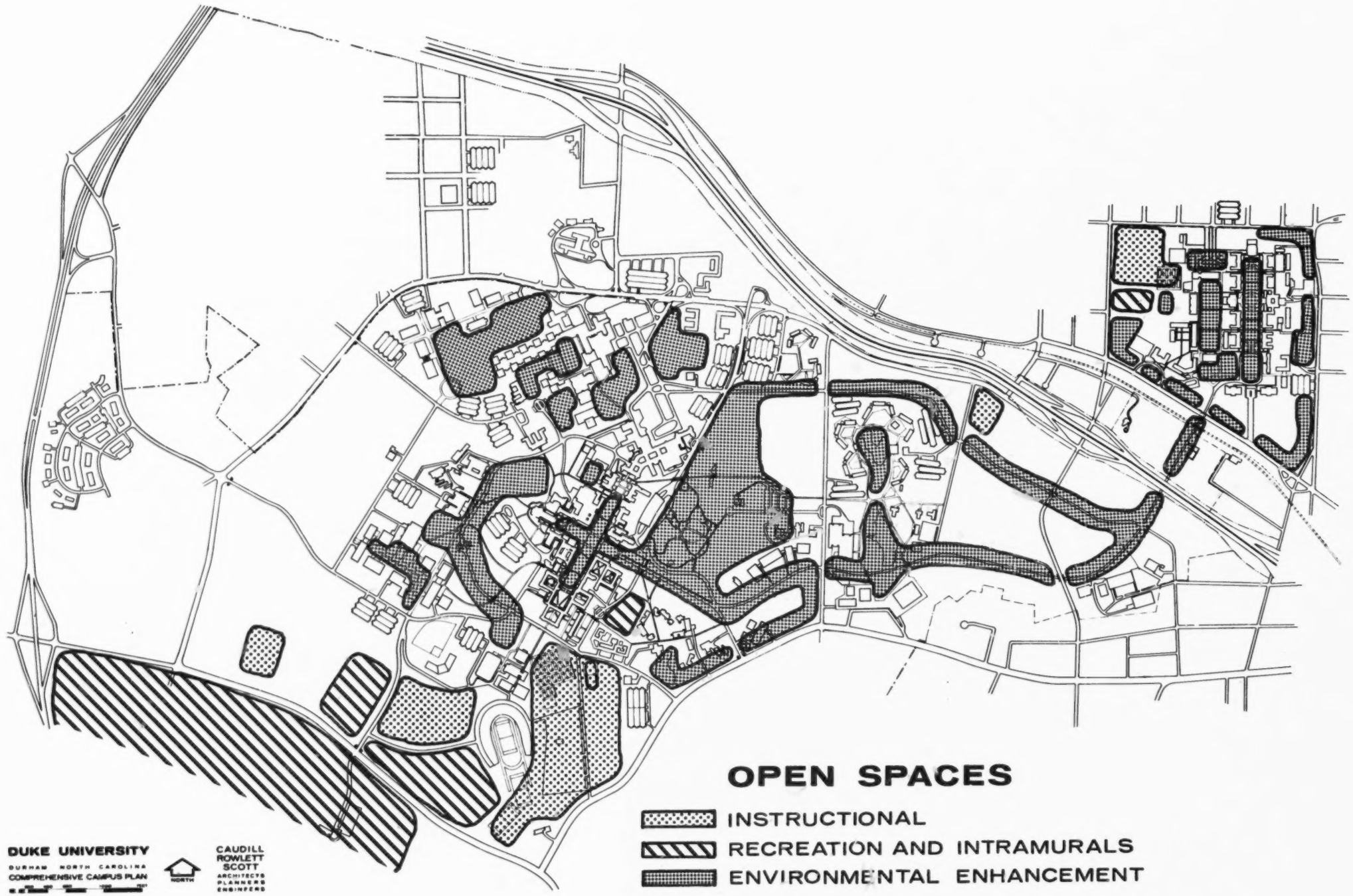
OPEN SPACES

It is often the open spaces which make the difference between a great campus and an uninspiring collection of buildings. Three types of open spaces must be considered, as shown on the plan at right.

1. Instructional Open Space: The largest amount of this space will be required for physical education. However, botanical arboretums, sculpture courts, and even animal runs may be utilized to add more than just a functional asset to the campus.

2. Recreation and Intramurals: These areas should be developed near residence halls for convenience and spatial relief. Such areas can be enhanced by good maintenance and perimeter landscape plantings.

3. Environmental Enhancement: Many of the spaces in the other two categories can be utilized to serve this objective. The continual design and improvement of outdoor areas should be pursued to complement nature and perpetuate the fine precedents set by the Sarah P. Duke Gardens, the Gothic Quadrangle, and the Georgian Mall. Building sitings which disrupt rather than form open space, such as those along Science Drive, must be avoided. The spaces designated on the plan do not nearly cover all the potentials for environmental enhancement, but these should provide basic anchor points for development and be considered inviolate in principle. For example, some areas shown on the plan as lakes now are forested. They may not be developed as water features for many years but should be retained as open parks.



OPEN SPACES

- INSTRUCTIONAL
- RECREATION AND INTRAMURALS
- ENVIRONMENTAL ENHANCEMENT

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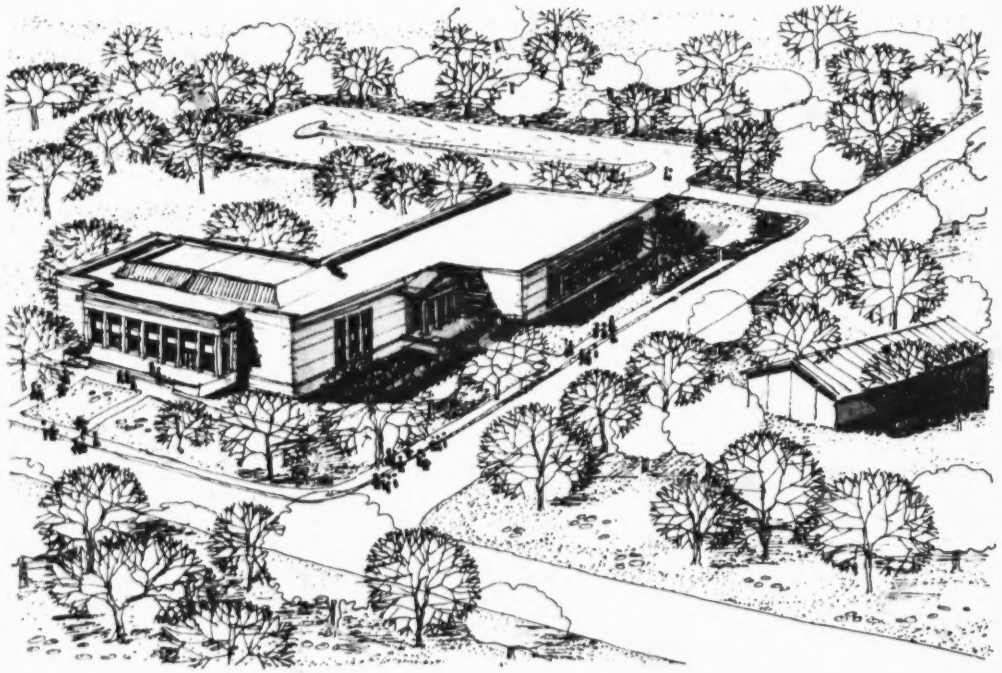
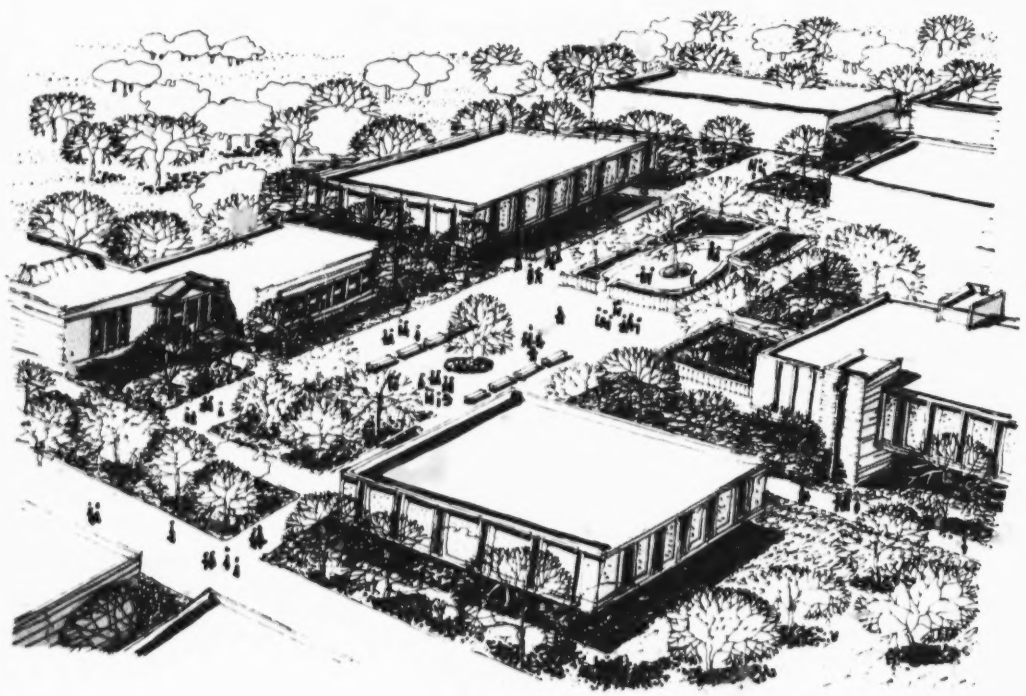


The two sketches at the left illustrate the general nature of a comprehensive architectural and landscape approach. The case study is the conversion of the intersection of Towerview Road and Science Drive to pedestrian malls within a new building complex. Portions of the existing street might be removed for planting, and new walk surfaces placed directly on the old paving. The layout can allow access for small service vehicles, yet assume a pedestrian scale and character.

Many specific design recommendations for treating open space appear in the next section.



CAMPUS DESIGN

The emphasis of the first Duke design study was on the West, or Gothic, campus. It was here that a recent departure from the original high standards of architectural planning was so obvious. The success of the original quadrangle resulted not only from the architectural drama of the buildings but from the outdoor spaces that they formed. An extensive analysis of these qualities and recommendations for architectural criteria which would assist in perpetuating them through modern technology were published in the Campus Design Study - Duke University in November, 1963. Subsequent studies have been made for the remainder of the campus.

A major point of the study applies to all areas of the campus — east, central, and west. A campus is composed of exterior rooms as well as interior rooms. Any time more than one building is built, an exterior space is formed which may be more important in establishing the environment than the buildings themselves. The quadrangles on both areas of the Duke campus illustrate this point vividly and justify the belief that future placement of buildings must also create stimulating spaces, approaches, and vistas. Future plans must be concerned with appropriateness to site and function as well as to materials and style. Such planning must promote cohesiveness of the campus and recognition of the visual composition and relationships of the existing buildings.

The analysis and recommendations of the design study were arranged in three broad categories: 1) CHARACTER, or the essence of the environment, 2) COMPONENTS, or elements which shape the design, and 3) COMPOSITION, or the arrangement and assembly of the components.

It must be emphasized that the design recommendations cannot be reduced to one permanent formula devised to set the style of Duke buildings. Such an approach has resulted in the present dilemma. Instead, architectural guidelines and a "vocabulary" are proposed, from which to draw components and suggestions as to how they could be arranged to achieve the desired campus character. The success of their implementation must depend on the imagination of capable architects and the judgment of an alert administration and Building Committee. The "vocabulary" will change in the future as does technology, overcoming a basic weakness of a style formula. The spirit must remain.

A summary of the findings and recommendations of the design study follows.

WEST CAMPUS AREA

This campus is characterized by beautiful rolling terrain, densely wooded and superbly landscaped; strong architectural unity through steadfast adherence to a formal axial plan and consistent use of materials; a magnificent chapel; and a row of unrelated new red brick buildings on the western perimeter of the campus.

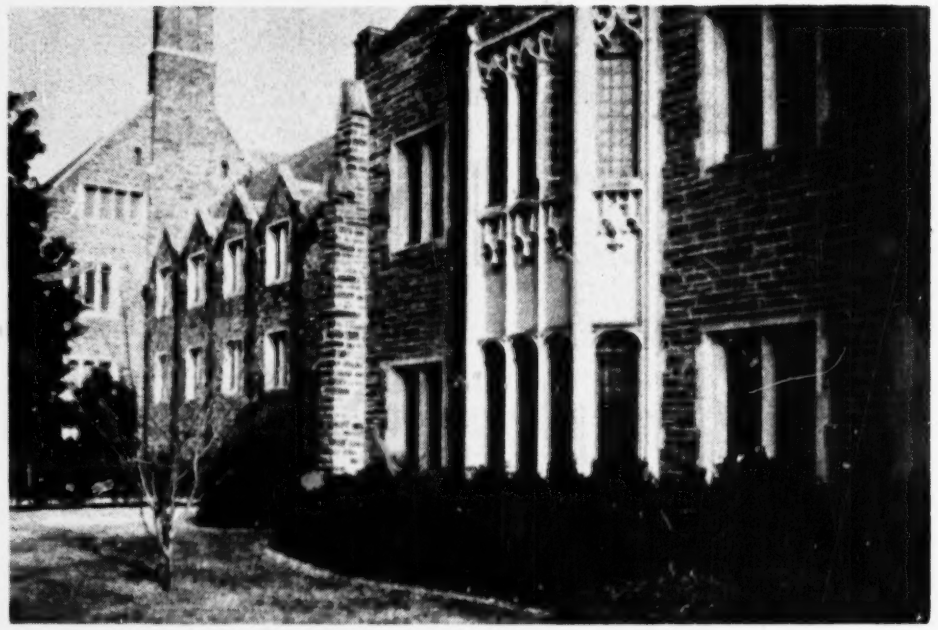
CHARACTER

The essence of original Gothic architecture was the honest expression of plan and structure, and this functional approach must be the determinant of the future architectural character. Buildings must result from a problem-solving approach which pays deference to certain characteristics inherent in both the Gothic and Duke traditions. These

characteristics are:

Verticality
Human Scale
Richness
Variety
Unity

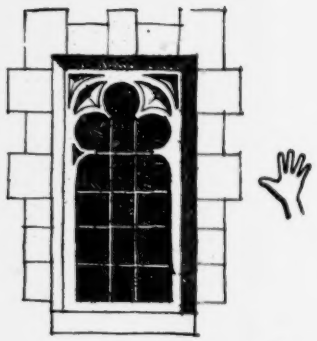
Verticality. The vertical feeling should be expressed and emphasized wherever possible. The vertical elements most readily expressed are columns. Stair towers, pipe chases, and various types of rooms may be offset in plan to achieve a vertical break in the building and cast shadows on adjacent surfaces. Windows, doors, and wall panels should be given vertical proportions where possible. Where the width of a group of doors or windows exceeds its height, they should be detailed to read as a group of vertically proportioned units rather than as one horizontal element.



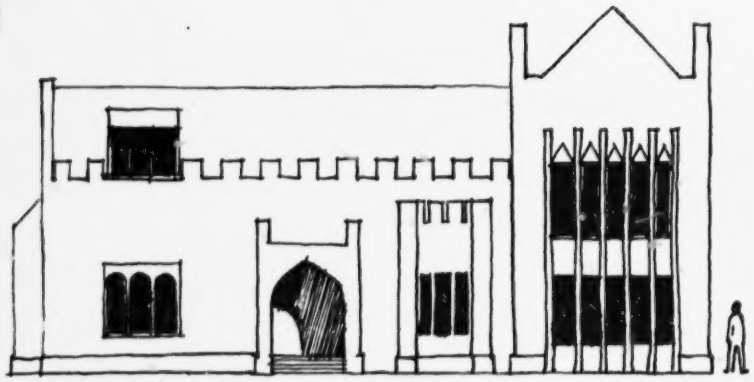
Scale. When approaching the west campus, the scale is dominated by the centrally located Chapel spire. The individual scale of the older buildings is faithful to the Gothic, in which the individual units were based on the size of a man's hand. The larger elements are generally proportioned to the height and width of a man. This emphasis on human scale helps explain why the Gothic style permitted a cathedral or a house to be equally successful in their appeal to people.

Future buildings must relate to the human being. This can be most readily achieved in smaller elements such as doors and windows, which should be grouped and detailed to read as human-sized and usable elements.

Large uninterrupted planes should be broken up through emphasis of joints, shadows, and the size and texture of the material used. Expression of the structure can also help to prevent massive and inhuman scale.

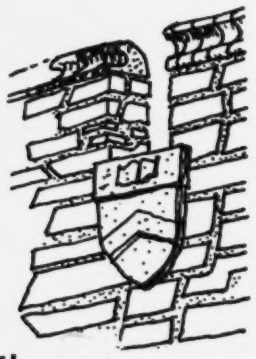


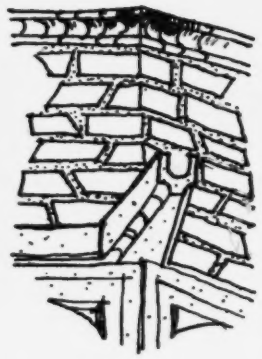
HUMAN SCALE --
Hand-Sized Units



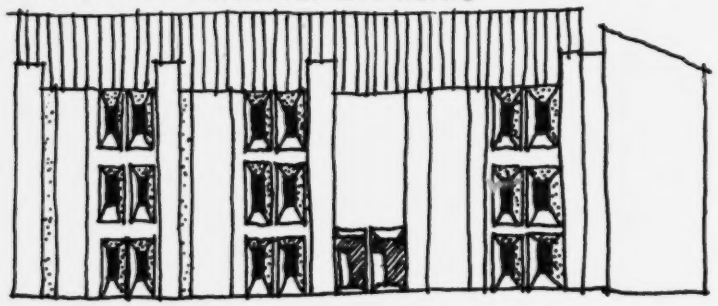
All Elements Should Reinforce The Human Scale

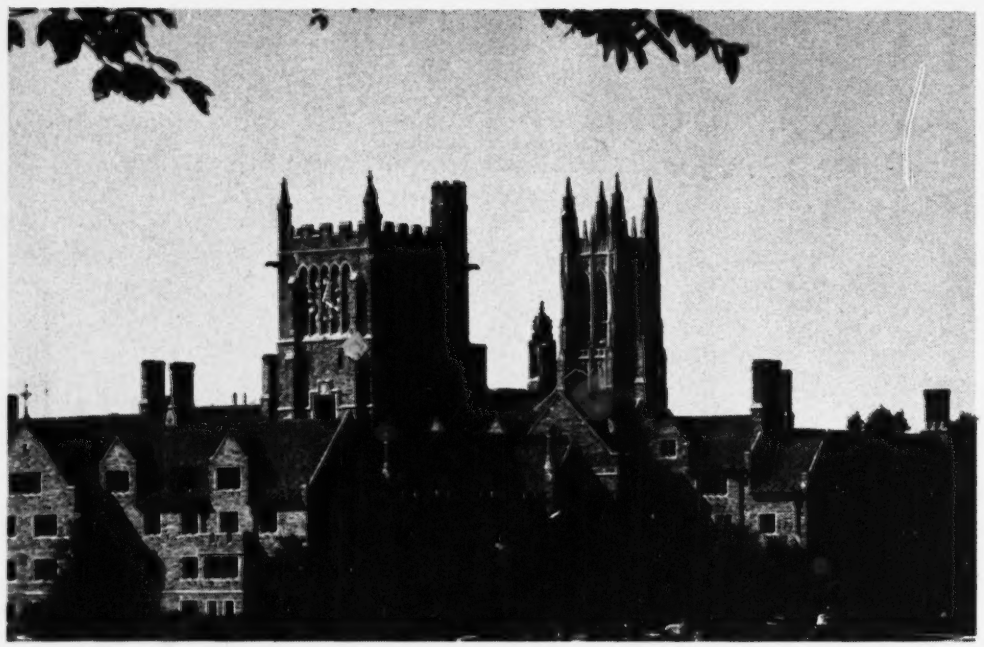
GOTHIC ORNAMENT





Enrichment of Essential Elements





Richness. The decoration of future buildings should be an extension of the Gothic tradition of enrichment of essential elements, rather than applied ornament. This can be done through the refined detailing of structure, joinery, shadows, and textures. Window framing, door hardware, exposed aggregate concrete, reveals (notches) to catch light and shadow, corners, and overhangs can all be handled in ways that enrich without ostentation or artificiality.

Variety and Unity. Within the strong framework of unity established by the basic materials and Gothic style, Duke has an amazing variety of building heights, plan arrangements, roof types, window and door design, and detail enrichment. This is further emphasized by the jagged Duke skyline.

Modern technology will bring a tendency to more uniformity in construction. While this will simplify the problem of achieving unity, more effort will be needed to recall the variety of the Gothic buildings. The informal nature of most future building sites will help. Variety should be sought in plan, window groupings, building heights and silhouettes, structural bays, and the expression of the various functions taking place. This variety must be captured in the outdoor spaces formed as well as in the buildings.

Visual unity must be maintained to give coherence. The consistent use of materials, vertical expression, human scale, and structure as well as careful design of outdoor spaces and vistas can weave a thread of continuity through the campus.

COMPONENTS

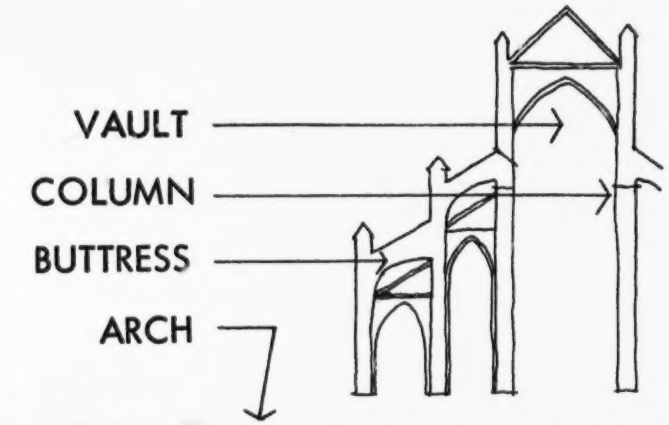
The choice of building components must: 1) solve the program requirements of the particular building and 2) bring the building into focus as a harmonious element of the total campus environment.

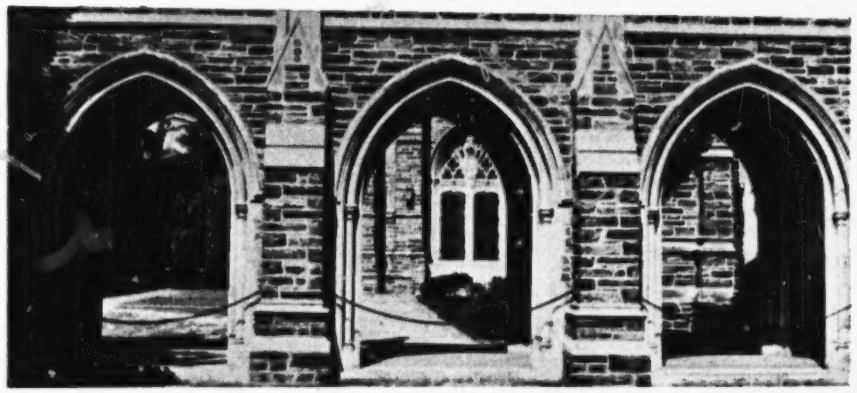
The components of the Gothic style found their purest expression in the cathedrals and are familiar to all: high roofs, ribbed vaults, the pointed arch, large window areas divided by traceries, decorative structural and functional elements.

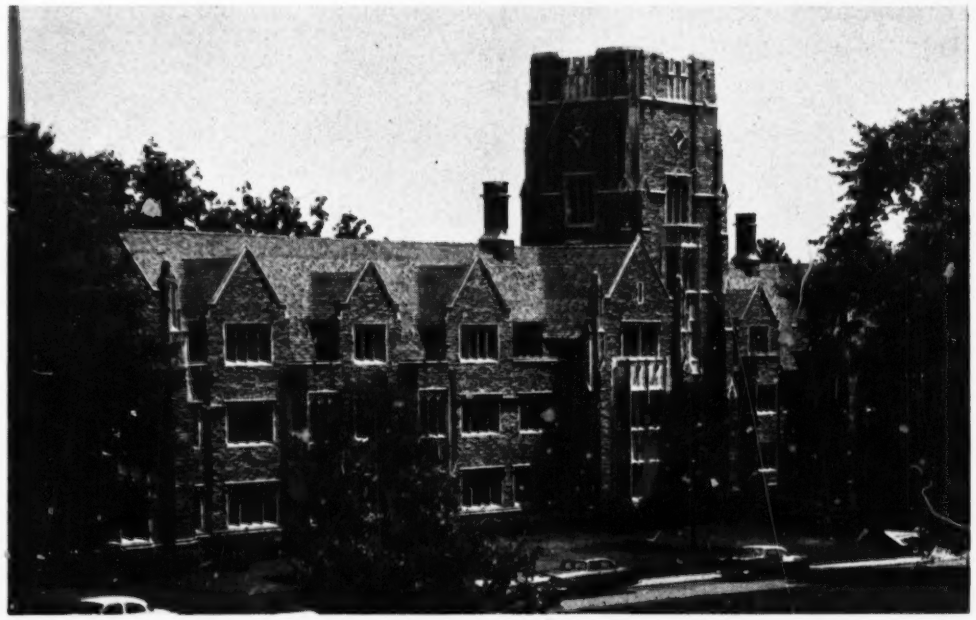
Structure. The basis of the Gothic architecture was skeletal construction with nonload-bearing walls and windows filling in between the structural elements. When massive supports were needed they were designed as a "bundle" of small columns to maintain the human scale. The arch form was characteristic.

In any continuation of the Duke architecture, the structure — especially the vertical elements — must be consistently emphasized. The material used for columns could be different from the wall planes, for vertical and structural emphasis, although this is a departure from the original Gothic. The arch form could be recalled in precast concrete. Where the plan permits, two bays of different dimensions could be established and repeated (i.e., for bedrooms and bathrooms) for variety and emphasis.

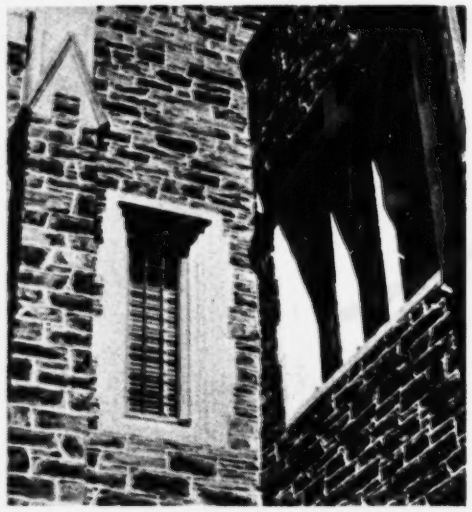
Materials. Consistent use of a material with a strong visual impact provides a unifying force and in some instances implies a continuity of style which doesn't really exist. The stone from Duke's quarry could be continued to insure harmony of the old and new, but modern technology will

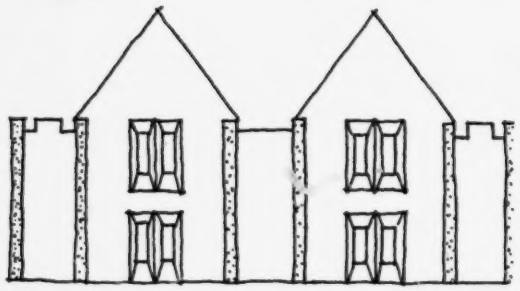






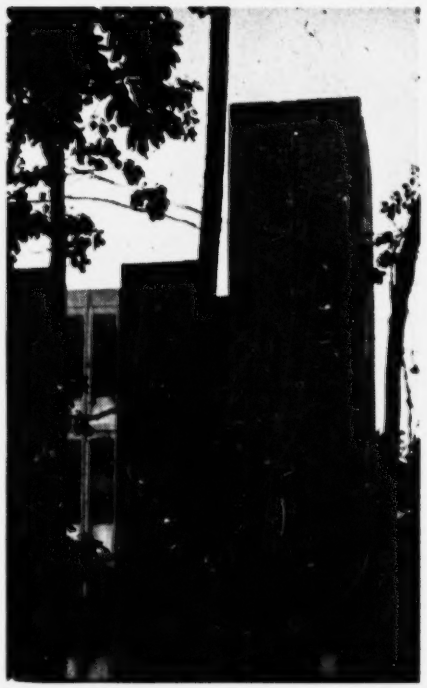
PLANAR EMPHASIS





Elevation

Plan



provide more economical and functional applications than past methods of laying up by hand. The feasibility of using large pieces of crushed Duke stone exposed in precast concrete panels has now been demonstrated on the campus. Other techniques could be investigated. Other strong materials on the Duke campus are the limestone trim, dark windows, and slate walks. These elements should be continued in cast stone trim, glare-reducing gray glass, and walks of Carolina bluestone for economy.

Color. The color of the stone buildings has a chameleon-like, or pointillist, quality. At close hand the effect is of brilliant color, with the individual stones of rust red, orange, yellow, and various hues of gray, topped with roofs of mottled gray-blue tile. From a distance the colors fuse into a warm, somber gray.

New buildings on the west should respect the warm dignified gray quality of the existing stone buildings. Contrasting light trim should be used in similar proportions. The dark windows will be more effective if the view of white venetian blinds is eliminated with gray glass and drapes. Contrasting color schemes such as red brick and white trim, or colored panels, must be avoided on the west campus area.

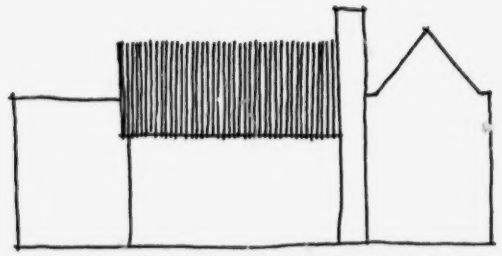
Planes. The Gothic architecture at Duke expresses a planar emphasis. This planar effect should be continued, but care should be taken to differentiate between structural and nonload-bearing elements. This may be accomplished through a change in materials or texture or a change in plane. Offsets in plane between various types of rooms or building elements such as stairs will further reinforce this quality.

Roofs. Three principal features of the Duke roofscape — pitched roofs, towers, and battlements — produce an impression of variety which is an honest inheritance from Gothic architecture. The pitched roofs have a minimal effect because of their color and the dominance of other elements. The main impression is that of a jagged skyline.

Both flat and pitched roofs should be used as appropriate for the building. The jagged silhouette should be recalled through the variety of roofs and building heights and through the vertical extension of elements such as stair wells and pipe chases. Vents might be grouped and enclosed in towers which provide a visual and functional use. Pitched roofs of standing seam metal might be used over narrow buildings with minimum need for exposed mechanical elements. This could be especially pleasing where buildings will be built in valleys and viewed from above.

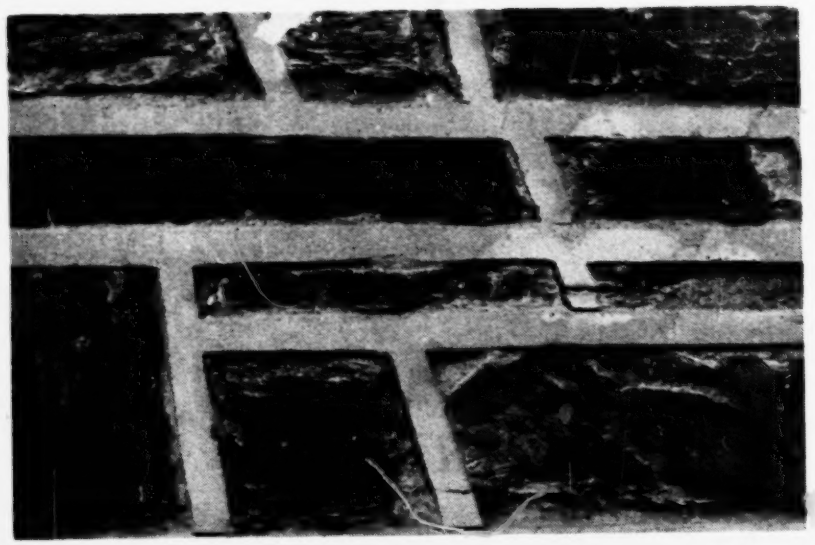
Windows. In Gothic architecture windows received a wide variety of treatment. They were likely to assume a random location because of functional requirements of the plan. They were also likely to be quite large, often filling the entire bay between structural elements.

Where possible windows should be grouped rather than isolated singly. They should be in vertically proportioned units. When feasible, doors and windows should be recessed to recall the deep voids of the existing stone buildings. Any variety of room sizes and functions should be expressed in the window spacing and design.



VARIETY OF ROOF TYPES

ROOFS AND WALLS
of similar color and texture



COMPOSITION

Additive Quality. Gothic architecture has a highly developed additive quality. Buildings and components of buildings are attached together in a variety of ways. This is in contrast to building types in which a volume is implied from which corners, slots, and holes have been subtracted.

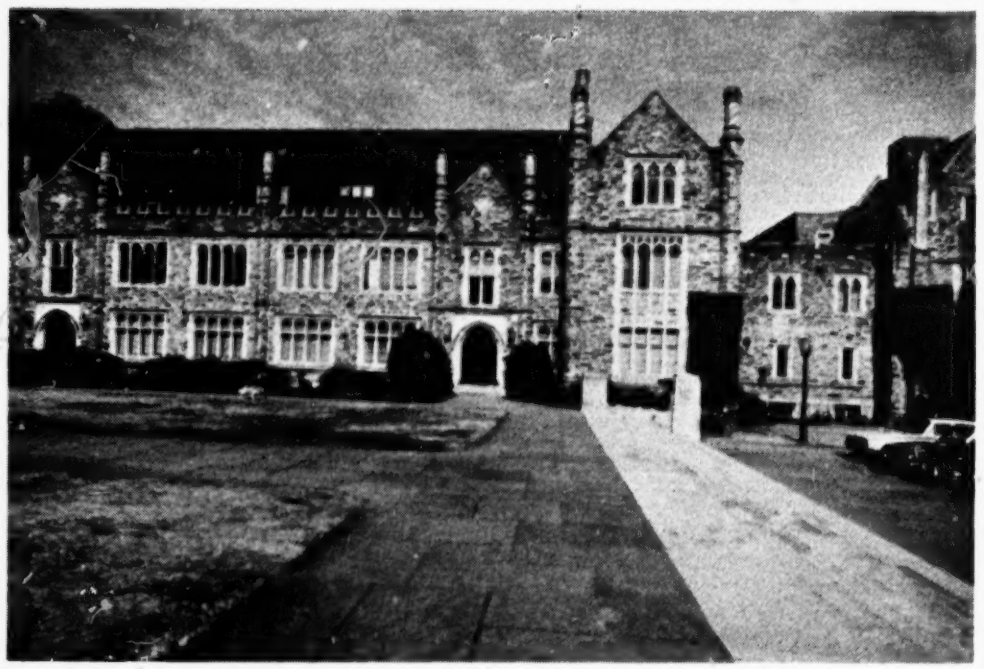
The design of each building or group should be approached as a process of joining together many components rather than as a process of carving a sculptural object.

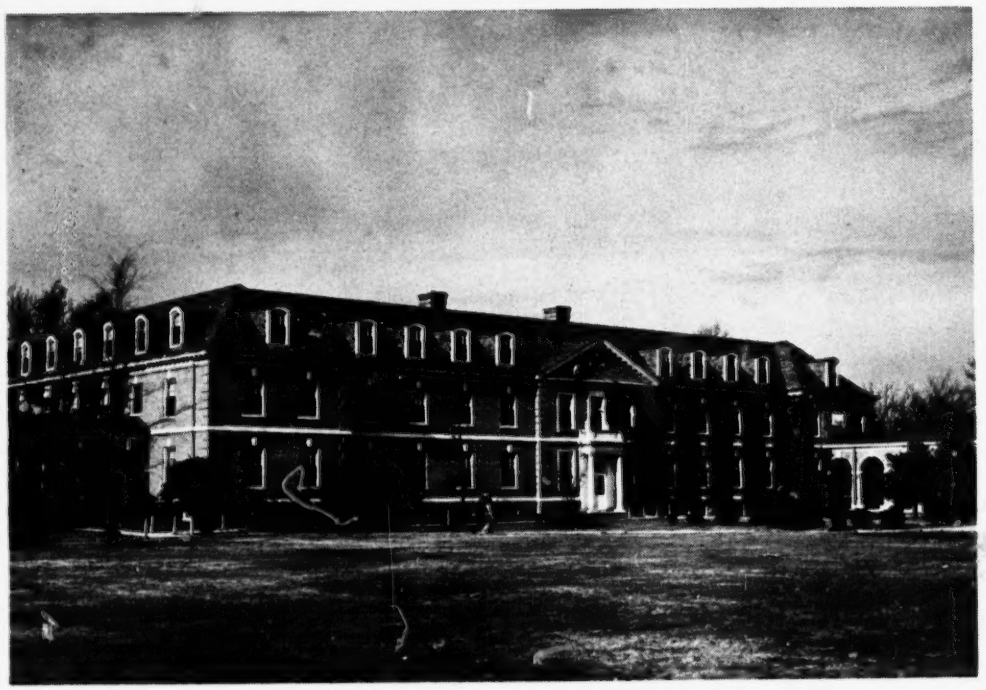
Joinery. Two categories of joinery are of interest: 1) the joining of the principal building forms, and 2) the joining of materials and components. The additive joining of buildings can be accomplished directly, through arcades and walks, and around courts and open spaces in a variety of ways to result in a harmonious whole. Joining techniques should be developed which are suitable for the materials and contribute to the enrichment of the whole.

Spaces and Voids. One of the most important virtues of the Duke campus is the pleasing combination of spaces formed by the arrangement of buildings around the quadrangle. This spirit should be captured in new groupings in two ways: 1) through "fortuitous spaces," those occurring where the design of the building is considered first and the space is generated more or less incidentally. These appear most frequently as small irregular nooks. They add variety and surprise to the environment, and are usually informal in character. 2) with "deliberate spaces" where the outdoor room is designed first, and the buildings serve to enclose it. These areas are more formal and monumental in character.

At both the building and detail level, conscious study must be made of the "empty" spaces and voids created. Voids such as windows should impart the dark, solid quality that they do in the existing buildings. Outdoor spaces must be studied for their formal or informal qualities, and their relation to a human or monumental scale. They must be carefully woven together into a unified whole. The approach must be to enhance the outdoor space with building additions; not to disrupt it, and to enhance buildings with the various voids, reveals, and penetrations; not to clutter or litter them.

Termination. Care must be taken to recall the solid deliberate manner in which the Gothic buildings meet the ground, and the jagged silhouette of their meeting with the sky. Building elevations must be studied as the ends of outdoor rooms, not merely as facades. Buildings and spaces do not end in a vacuum; they meet other buildings, spaces, or objects. Thus, termination must be approached as a form of joinery.





EAST CAMPUS AREA

The Georgian east campus, although based on a formal axial plan, presents a striking contrast to the Gothic west. This results partly from the difference in architectural style, but also to a large degree from the more level topography and simplicity of landscape treatment.

CHARACTER

The spirit of the architecture on the east has a quiet dignity and restraint. The spaces defined by the simple brick masses are restful and serene compared to the ever-changing spaces and masses of the Gothic west. The mall and its enclosure of buildings is symmetrical. The total effect is formal, but not monumental. The basic characteristics are:

Horizontality
Simplicity
Unity
Scale

Horizontality. Much of the serenity of the campus can be laid to the horizontal emphasis of the architecture. This horizontality is achieved through prominent limestone belt courses at each floor, well-defined cornices, and the cap of the pitched roofs. The exceptions are deliberate; verticality is established only to emphasize the five most important buildings — East and West Duke, Baldwin Auditorium, the library, and the union.

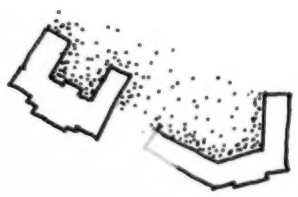
This same philosophy should guide future design on the east campus. Unless particular circumstances of function or heirarchy are to be expressed, the horizontality of the Georgian tradition should be maintained.

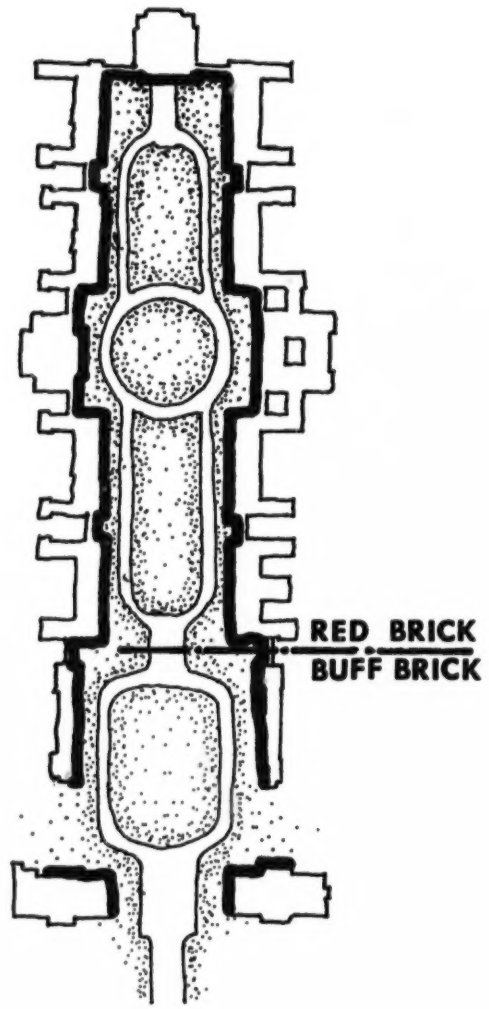
Simplicity. The architecture is simple and direct, with few surprises. There is little enrichment except for the prominent entrances to key buildings and some interesting details around cornices and windows. This understatement on the part of the individual buildings places them in the role of a backdrop to the space formed.

Future buildings should be kept simple. The architecture can be more informal and functional but with deliberate restraint in the use of materials, enrichment, and form. There is no rationale for "prima donnas" in this setting.

Unity. The basic elements which contribute to the unity of the east campus are the coherence of the original mall plan, the consistent horizontality and simplicity, the use of brick (even though of two colors) with white trim and tile roofs, and the natural, clean character of the landscape. This unity is violated by the siting of the two residence halls to the west of the mall, which become isolated rather than related to the campus. The four original buff brick buildings at the south end of the mall blend in with the total campus in the way they continue the basic space formed. Unity is achieved even though the architectural character differs.

The sensitive forming of outdoor spaces with restrained buildings and landscape will be the key to retaining the unity and character so cherished by those familiar with the Woman's College at Duke.





Scale. Human and monumental scale have been used as devices to establish the hierarchy of buildings in the Georgian mall. The space is terminated with the most monumental building of the group, Baldwin Auditorium. The overpowering scale is established by the high entrance with its massive columns and pediment and its dominant domed roof. The library, union, and East and West Duke Buildings are also monumental in scale, with their colonnaded entries, lofty floor-to-floor heights, and large windows. The general classroom buildings and residence halls are human in scale with lower ceilings, smaller windows and entrances, and walls broken into small planes of masonry.

Most future architecture should strive for a human scale. The same philosophy of reserving the grander scale for a few unique and important buildings should be followed.

COMPONENTS

All five of the major building components are handled differently on the east than on the west.

Structure. The Georgian buildings do not expose their major structural elements. The detailing of lintels over windows and doors, and the use of colonnades at principal entrances are among the few structural features expressed. If the structure is exposed on future buildings, the material should be concrete with a light-colored aggregate and white cement to recall the limestone trim. The use of exposed structure should not be encouraged, however. It would be a strong departure from the character of the existing campus.

Roofs. Pitched tile roofs with dormers are predominant. The exceptions — the auditorium, library, union, and gymnasium — have a structural basis in the long spans required. In this case, the difference also reinforces the hierarchy of buildings. Roof design must be determined mainly by the structural and mechanical requirements of the building. When feasible, it may be desirable to incorporate pitched roofs as a unifying element. However, this should never be forced.

Windows. The design of windows is simple and generally consistent. Most of the windows are vertical in proportion, isolated as single units, and enclosed in white frames of limestone or wood. A precedent is established for the vertical grouping of windows in the original buff brick buildings and in the three principal red brick buildings. Success in maintaining the serenity and dignity of the campus will depend in part on simple and subtle treatment of components such as windows.

Materials and Color. The early buff brick buildings flanking the south end of the mall blend because they become a backdrop to the mall and landscaping. This same approach could be used in completing the residence complex west of the mall in buff brick. With that exception, it should be basic to the future architecture to recall the red brick and white trim of the Georgian buildings. The white trim can be continued in cast stone and in exposed concrete mixed with light-colored aggregate and white cement, but this should not be forced or applied without reason.

COMPOSITION

The mall, or space, is a more powerful element on the east campus than the buildings themselves. The buildings are subservient to the space and landscape, and this compliance itself is a unifying factor. It makes sense to recall the materials and spirit of the Georgian architecture but the composition of building groups and landscape becomes primary, using anonymous architecture at its best.

Joinery. The spatial experience of the mall is achieved by linking the individual buildings into a unified whole. Closely spaced buildings are joined by arcades which provide both connection between buildings and access in and out of the mall. The coherence of the space is further reinforced by the broad main walk which connects the buildings. Its central circle establishes the heirarchy of the library and union. An interesting link is also developed between the spaces formed by the buff and the red brick buildings. Linkage from the mall to the other buildings is not so successful. The mall "turns its back" on the remainder of the campus except at the main entrance.

Future buildings must be arranged and joined in ways which will extend spatial coherence throughout the campus. The walking surface and landscape planting arrangement must be carefully studied to achieve this effect. Although the Georgian mall is a complete entity, future buildings can be arranged as complementary additions and extensions, linked to each other and to the mall as shown in the plan.

Spaces. The space within the mall is deliberate, symmetrical, and defined by relatively even sides. However, the manner in which the buildings turn their irregularly shaped backs to the remainder to the campus virtually precludes the repetition of this type of space. The new spaces will be more informal in nature, but should retain the dignified spirit of the campus. The new mall should not "upstage" the Georgian mall; it should continue to be the primary space on the campus.

CENTRAL CAMPUS AREA

The central area, architecturally, is virgin territory. No style precedent has been established. This situation must not be interpreted as a license for practicing unrestrained "laissez-faire" design. The following points should be kept in mind as guidelines:

1. The physical environment of the central area must reflect the goal of University unity.

2. The basic concept is to develop coherent and unified building groupings in the tradition of the established quadrangles.

3. The rolling topography and extensive tree cover should exert a strong influence on individual building siting and the spaces formed.

The architectural design should be dignified and restrained. It is logical that the first group, just east of Anderson, reflect the design character of the west campus. Duke stone should be the masonry material. The introduction of brightly colored, highly reflective materials should be avoided. Although several unique building types will be located here, the tendency toward highly individualized buildings must be tempered with recognition of appropriateness to the group and the total University.

The most successful development can be assured by securing highly competent architects and landscape architects working within a minimum of control other than the above guidelines.

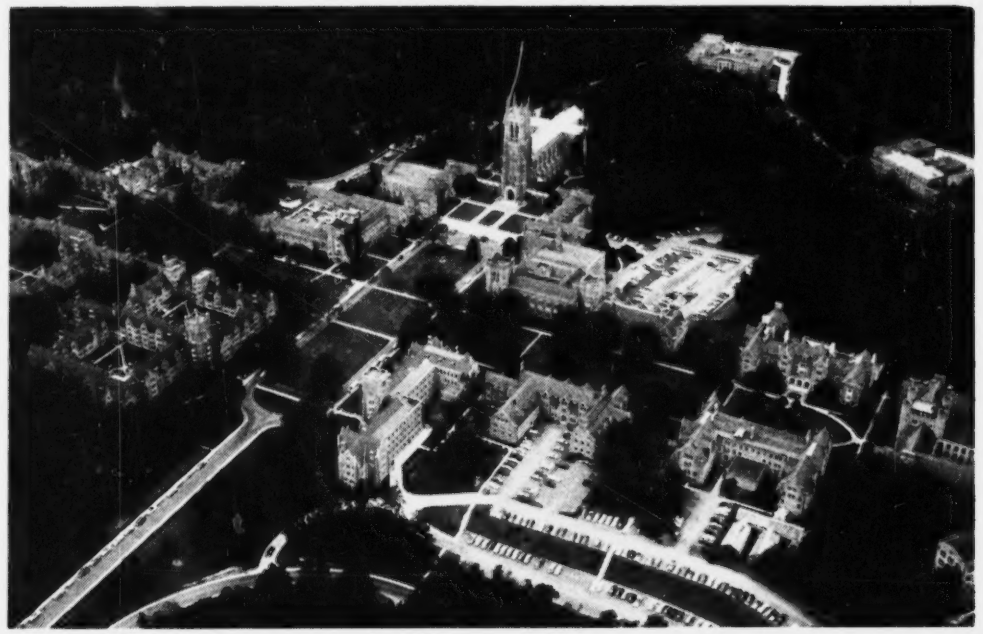
LANDSCAPE

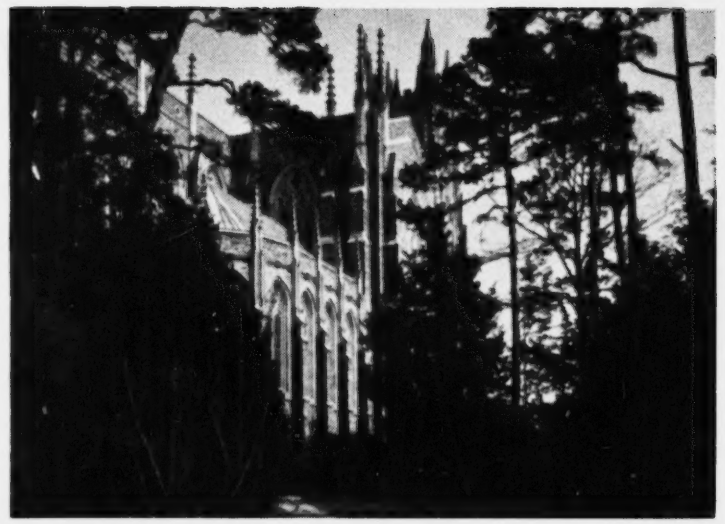
Since modern man requires shelter for his activities, the basic ingredient of a university campus must be buildings. Yet a really successful campus must be more than a mere collection of buildings. It must display evidence that its designers have devoted equal time and talent to all elements of its total environment, outdoors as well as indoors.

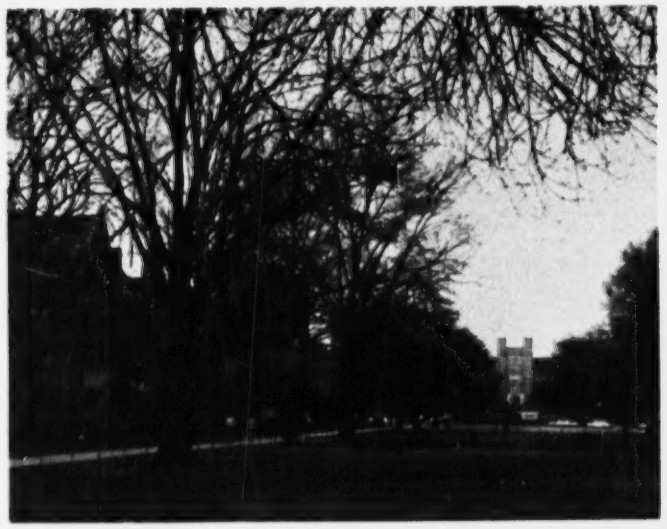
Spaces between buildings and spaces subdivided by buildings are as important as the buildings themselves. Walk surfaces, benches, trees, and other plant materials are as important to these outdoor spaces as floors, furniture, ceilings, and other materials are to the indoor spaces.

Sensitive utilization of topography and existing vegetation, the preservation of areas of natural beauty, and maximum use of the best views and vistas to and from and within the campus are all important factors in the creation and unification of the total environment.

The campus plan, then, should take into account, simultaneously, all of these important factors of planning and design. It must utilize the campus and its surrounding environment to the best advantage, not only to be efficient, but also to be safe, beautiful, and conducive to the important and dignified purpose for which it is intended. Sensitive landscape design, closely coordinated with architectural design and planning, can add much to the unity and dignity as well as the utility of the campus as attested by the original quadrangles at Duke.



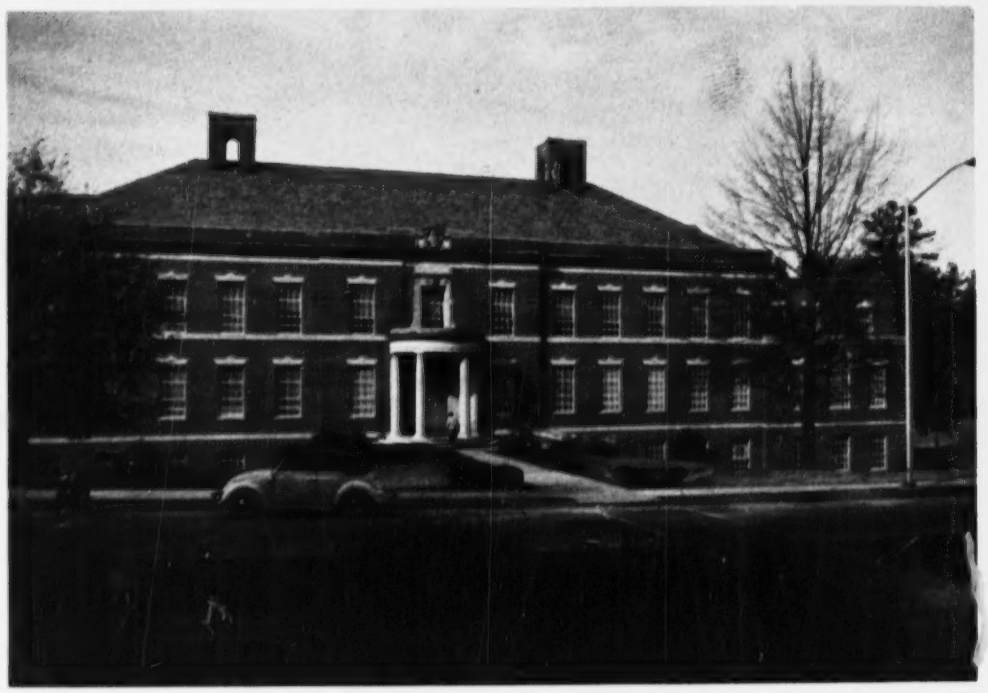




Time has proven the original Olmsted design to be a fine one. It is basically simple, serene, and dignified, in keeping with the University atmosphere.

The functional use of shade trees in the Gothic quadrangle and the Georgian mall is straightforward and lends unity to the campus scene. The judicious use of flowering species enriches these areas and adds variety without overpowering the natural surroundings. Plant materials are well placed and vistas well established. In some instances, areas of neglect and overgrowth have accumulated over the years. Aside from this, only minor criticism can be offered.

Unfortunately, more recent developments at Duke, such as those along Science Drive do not reflect this sensitiveness to the total environment exhibited in the past. Architectural design is inappropriate, siting is not sympathetic to the topography, outdoor spaces are incoherent, and planting design exhibits little, if any, functional or aesthetic unity.



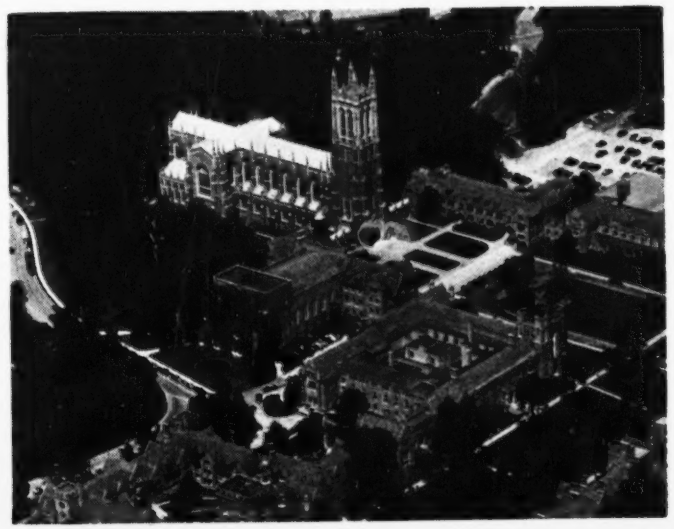
Duke is blessed with one of the finest natural landscapes in the country consisting of an abundance of native plant materials, dense natural forests, and beautiful rolling topography. These greatest of all assets should be respected and preserved with all possible determination and authority. Future development should insist upon more skillful siting of new structures, less site grading of a destructive nature for the sake of expediency, and the use of more retaining walls in proper places to conserve much of the natural beauty which the campus still possesses. Excesses of streets and surface parking desecrate the forests and topography. This should be avoided at all costs.

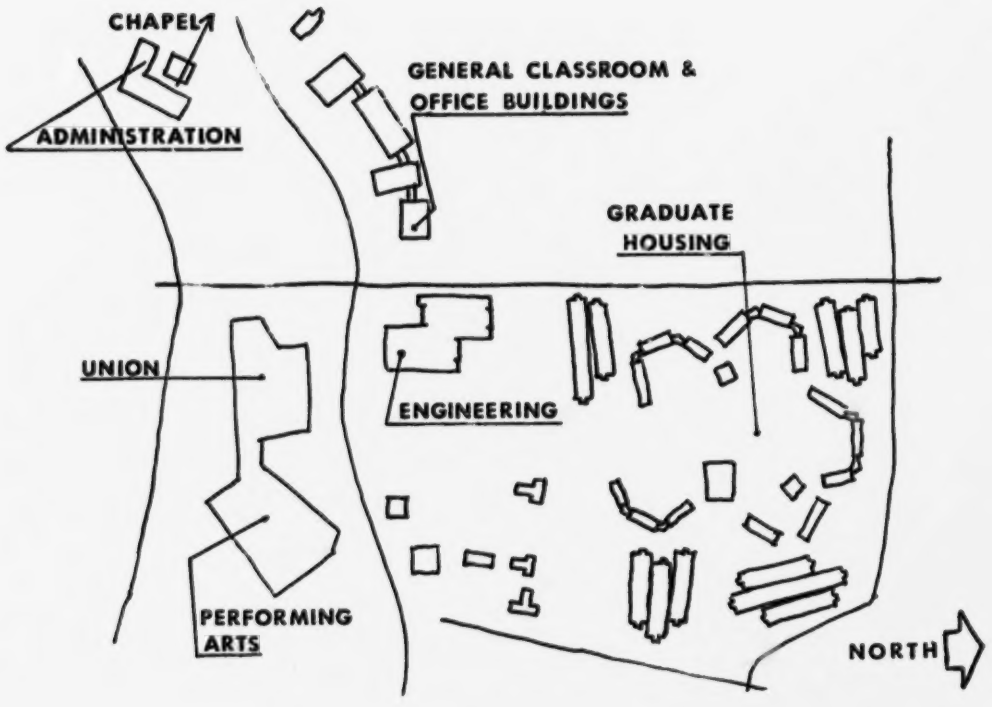
Planting design can serve many purposes on a university campus. Properly executed and maintained, it can provide shade, beauty, interest, and other elements of general human use and enjoyment; unity of the campus environment; soil, moisture, vegetative and wild life conservation; and botanical variety for education.

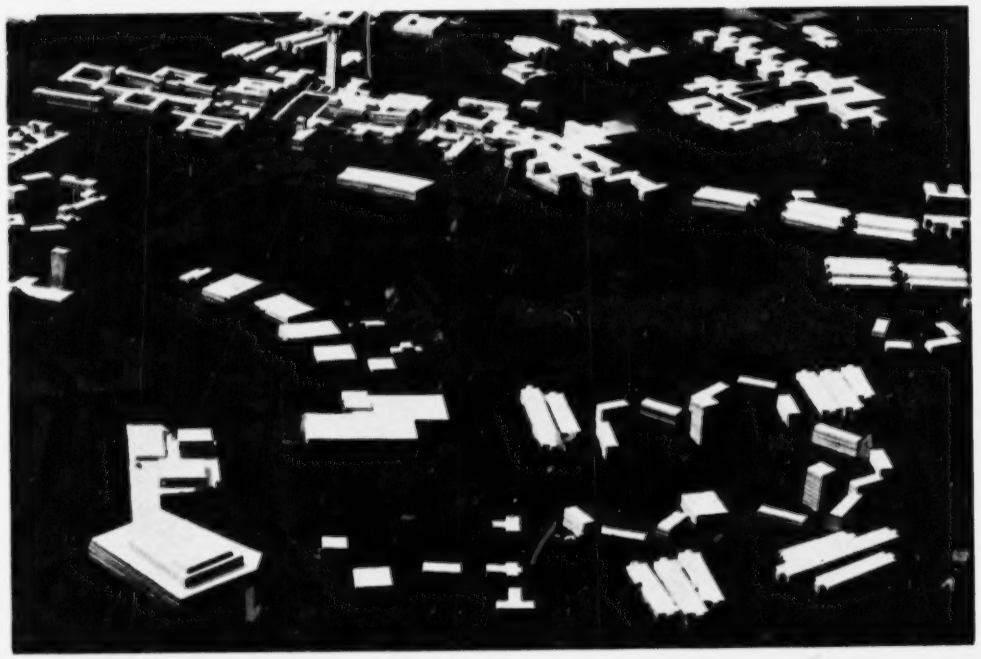
A continuation of the straightforward simplicity of planting design, in keeping with the original college plans, should dominate the basic landscape of future campus development. Such an approach is conducive to beauty, dignity, unity, and ease of maintenance. Reliable native species should be used predominantly in simple groups and masses for shade, screening, space division, and ground cover.

Variety in the landscape can be incorporated for interest and educational purposes through the use of selected specimens of various species strategically located to harmonize with the total environment. This should be done in a judicious manner in order to preserve the unity of the basic landscape and avoid possible aesthetic chaos. This can best be done through a cooperative effort of all interested professionals. The team involved should consist of University botanists, horticulturalists, project architects, and landscape architects.

The Duke landscape is one of its greatest assets. It should be protected, its minor deficiencies and areas of neglect should be corrected, and its dignified character should be extended throughout the campus as it expands in the future.







MAJOR BUILDING GROUPS

The two symmetrical axial plans at Duke are well suited to the level sites upon which the buildings are placed. However, there are few, if any, level sites elsewhere on the campus. Future building groups must take on a more informal nature as dictated by their site configuration, and their functional requirements.

No new buildings should be built before the total group of which they are a part has been planned. Such plans must be flexible enough to respond to refined program requirements as they develop, but the environmental concept can be established at the outset. The building groupings in the campus plan were studied with the assistance of rough models. Three of these areas are discussed briefly below, accompanied by photos of the study models, as an illustration of the principles behind their design. It is hoped that the detailed programs to follow will allow the basic concepts to be followed.

Central Campus. This area has quite pronounced topography which dictates the apparently random composition. The space is anchored at the south by a large complex containing the University Union and Performing Arts Hall. These two facilities are connected by a plaza covering a multi-story parking garage. The north half of the group is a graduate student housing area with perimeter parking structures. The residence halls cluster informally around a valley which could be developed into a lake. The two high-rise units provide a visual link to the south.

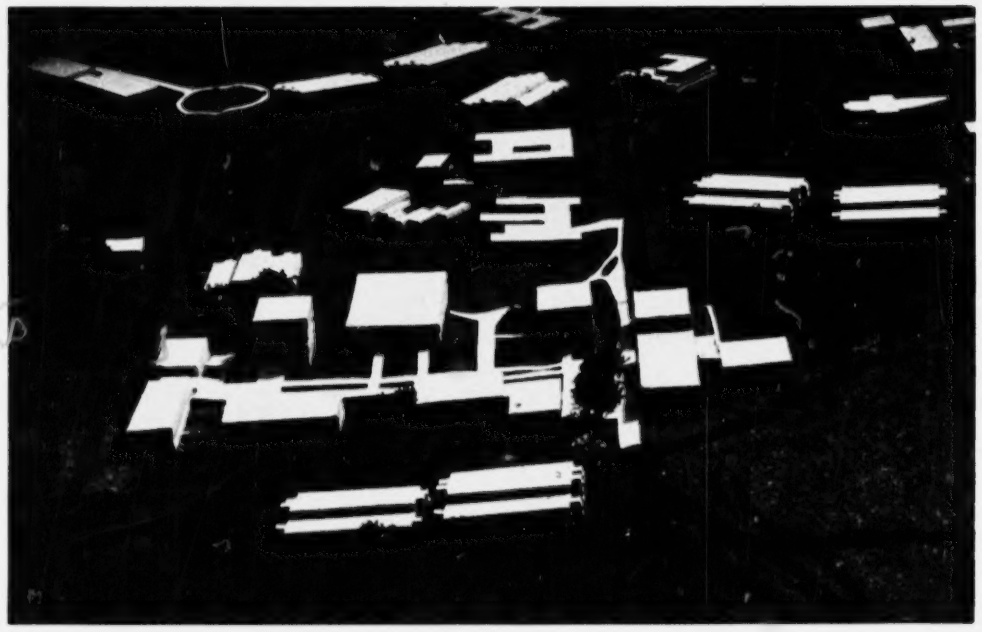
The total group is linked to the Gothic quadrangle by a series of general classroom and office buildings along Campus Drive, and by the axial relationship between the Administration tower and the Chapel.

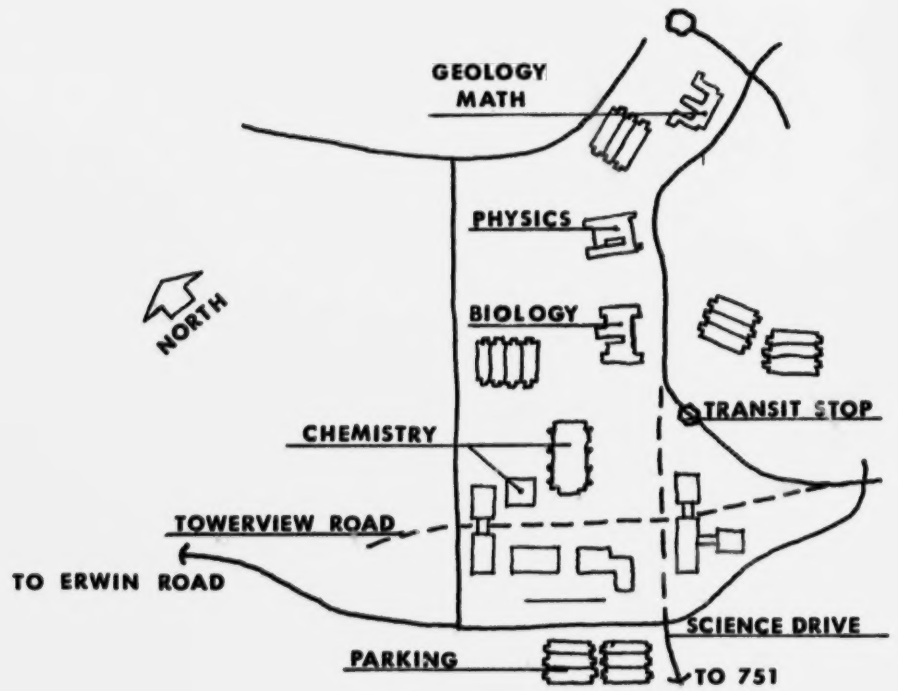
Science Complex. The natural sciences are already committed to a degree of detachment from the remainder of the campus. However, the trend toward a linear dispersal should be halted, and the remaining facilities grouped in a "science quad." This then becomes a meaningful feature at the southwest entries to the campus, as well as the visual termination of "science row."

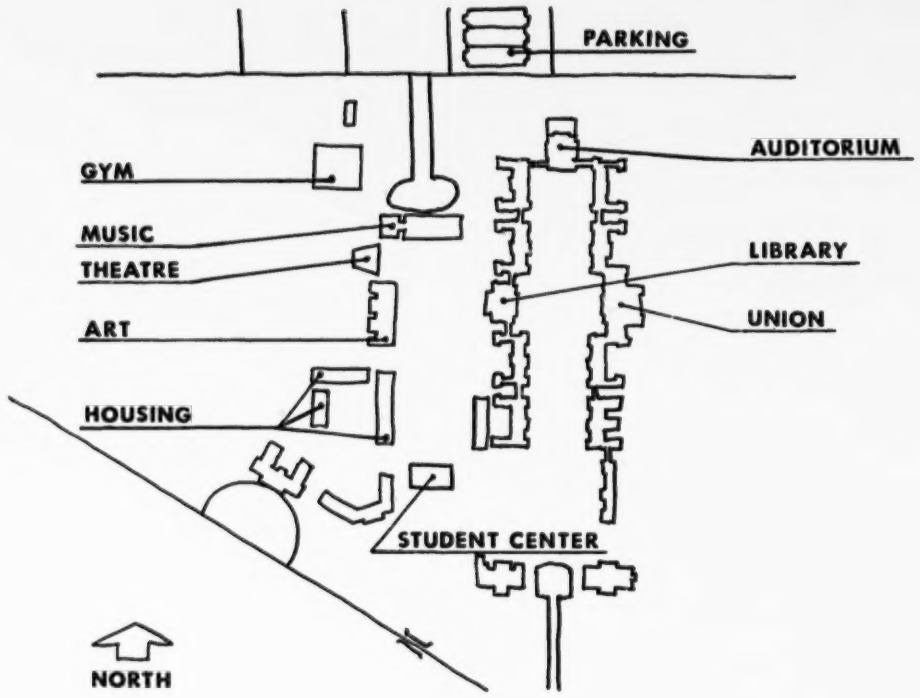
Segments of Towerview Road and Science Drive have been closed and converted to pedestrian malls. Large parking garages are located at the entrances from Erwin Road and Highway 751. A transit stop is located at the north Science Drive mall entrance.

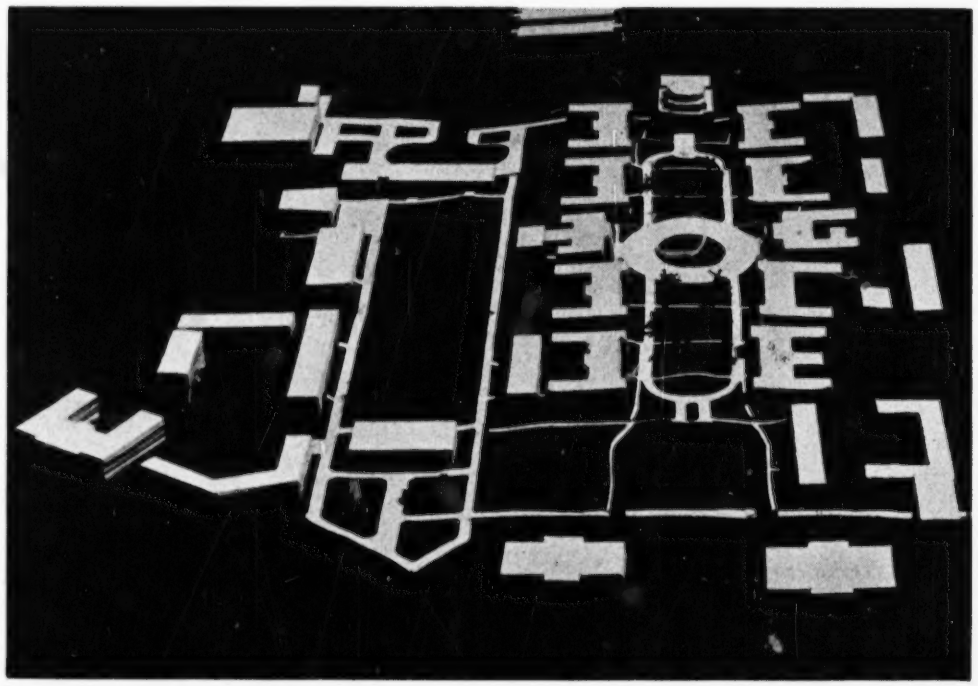
The new Chemistry Building (now in final planning) and its proposed expansion into a high-rise research unit are on the north side of the Towerview mall. The buildings on the west and south of the mall could be developed for research and related institutes. They are oriented to public access. The Law Building can remain or be converted to a science-related facility in the distant future. The complex at the intersection of the malls would house science instruction. The complex has an informal character, with a variety of building shapes and heights, to allow flexibility for unforeseen changes in this dynamic program. Many variations could occur without disrupting the coherence of the complex, if carefully studied and designed.

Woman's College. The objective here is to utilize future buildings to form a secondary mall to complement the Georgian mall. The topography here is flat enough to allow this. The new space is not formal and symmetrical, because it is formed partly by the irregular backs of the Georgian buildings. Thus it is hoped that the space will not compete with, but be an adjunct to the original mall.









As space-formers, the new buildings must be restrained in design. This discipline should help avoid the undue distraction of scattered, individualistic buildings in the serene setting of the Woman's College.

The new space does not have an open grand entry vista. This distinction is left for the Georgian mall. Instead, the south end is entered through the student center. The ground floor of this building should be largely open, providing a covered entry into the space beyond, and partly disclosing it to the view of those approaching the building.

The larger of the new residence halls does double duty in forming part of the new mall, and enclosing a more secluded court for the women's housing area. The proposed arts center is disposed along the side and end of the space, focusing on the recital theater at the northwest corner. This also provides desirable separation for acoustical control. The library is expanded into the new space, and in serving both malls provides an appropriate link between the two.

The transit service continues to enter the Georgian mall as it does now, maintaining its primary importance. Private automobiles will have their primary entry at the north of the new mall, for access to the arts center and Baldwin Auditorium. A parking garage is shown across the street to the north. The topography would also lend itself to construction of a parking level below the entrance north of the music building.

Additional residence halls and dining facilities may be added east of the Georgian mall, forming intimate courtyards. Those familiar with the campus will note that Jarvis Hall is not shown. If it becomes necessary to remove this building, advantage could be taken of the open space to strengthen the relationship between the two malls.

IMPLEMENTATION

STAGING OF DEVELOPMENT

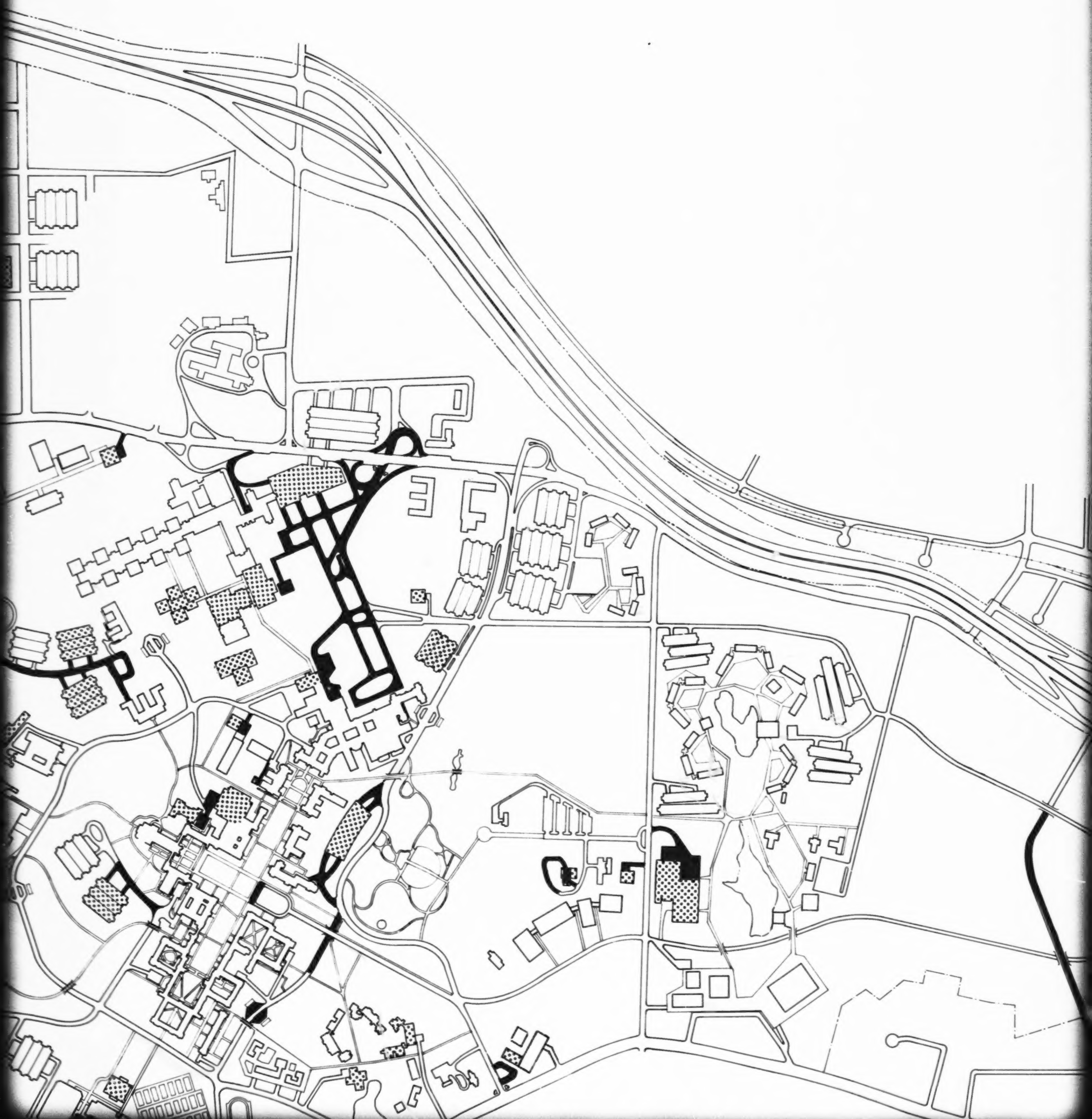
The following two maps illustrate the development sequence of programmed requirements as listed on pages 26 and 27. They also show the accompanying circulation and parking construction required to support this development. The specific building projects are listed on pages 33 and 34.

Stage A. Principal buildings to be under construction by 1968 include the Library, Chemistry Building, Divinity Addition, Physical Education and Residence Halls on the west; Engineering Building and Service Center in the central area; and Student Center, Residence Halls, Gymnasium and part of the Arts Center on the east. Construction in the Medical Center will include Medical Science I, Clinical Research II, Administration and Library Building and a Medical Education Building. The Swift-Maplewood thoroughfare connection should also be built during this period.

Supporting construction includes several parking structures. The major entrance into the Medical Center will be redeveloped. A new access drive should be constructed to serve the science facilities from the west. The multi-level parking decks between the Allen Building and the Duke Gardens should be served by a one-way traffic pattern, north to south. The underpass at the Chapel entrance drive will allow removal of Wannamaker Drive between the quadrangle and the new residence halls. On the east, the main entrance drive is redeveloped to allow separation of campus and public traffic.

Stage B. Major construction in this period includes further expansion of the Medical Center; Graduate Residence Center, Performing Arts Hall (hopefully) and completion of the Service Center in the central area; and a classroom building addition to Carr, Library expansion, renovation of Baldwin Auditorium and completion of the Arts Center on the east.

The construction of the expressway is expected during Stage B. Campus Street development includes several key projects. Extensive re-routing is proposed at the intersection of Science Drive and Towerview Road, to facilitate science expansion and separate auto and transit traffic. The North Campus Drive is completed. All the improvements are finished which are needed to implement the Circulation Plan.



DUKE UNIVERSITY

DURHAM NORTH CAROLINA

COMPREHENSIVE CAMPUS PLAN

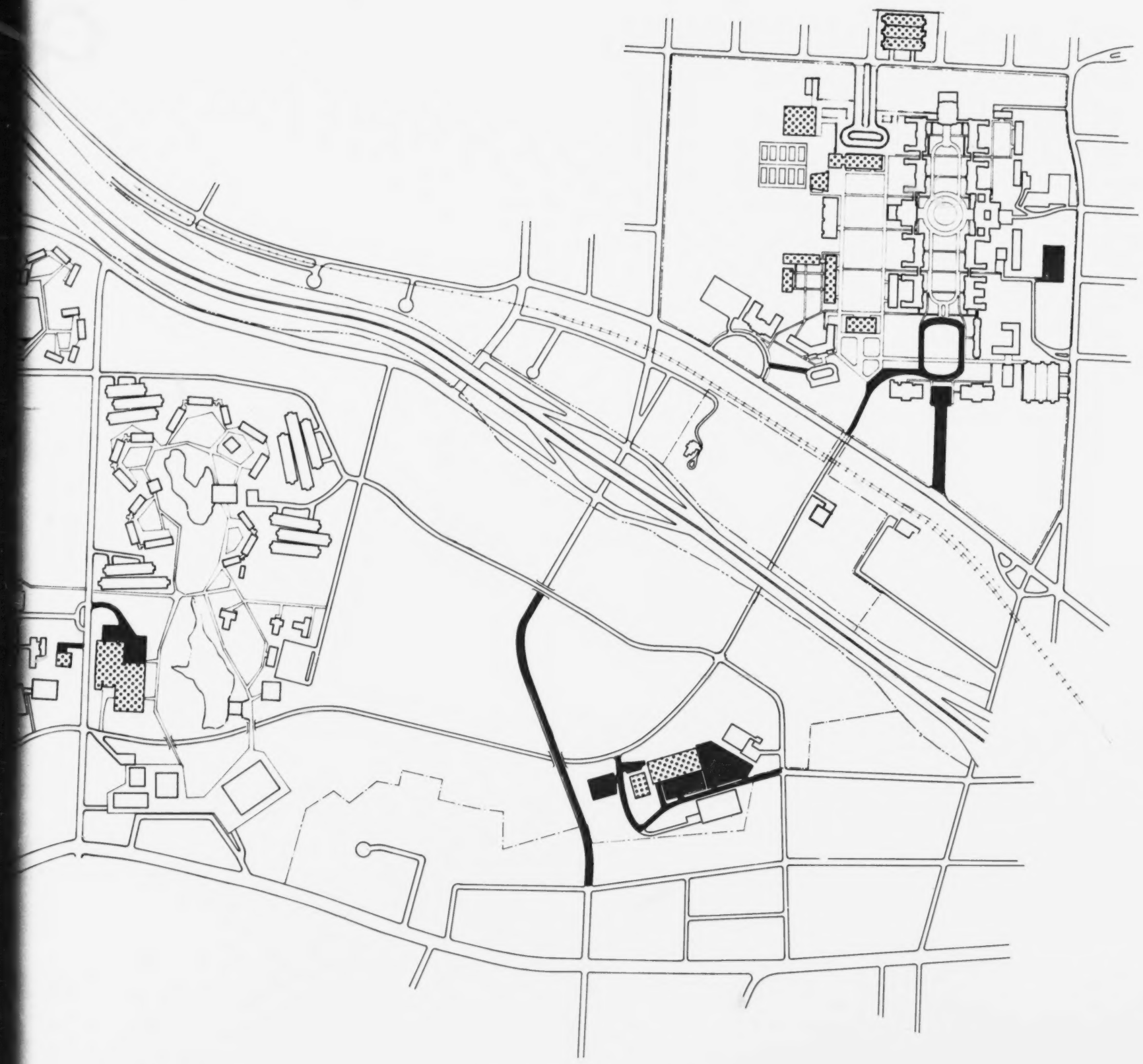
200 400 600 1000 FEET

NORTH

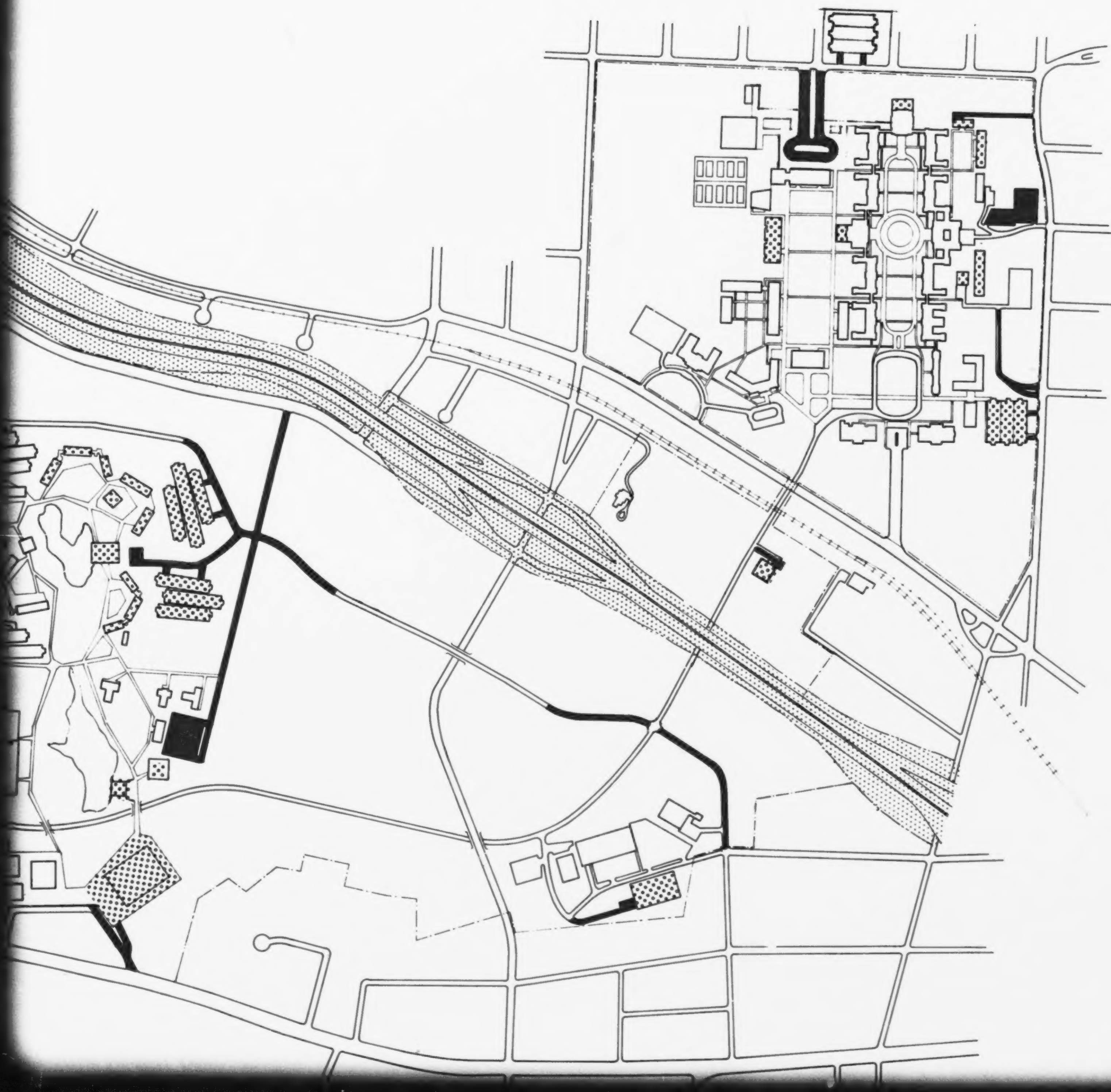
CAUDILL
ROWLETT
SCOTT

ARCHITECTS
PLANNERS
ENGINEERS

STAGE A
1965 - 1968



E A
1968



DUKE UNIVERSITY

DURHAM NORTH CAROLINA

COMPREHENSIVE CAMPUS PLAN

200 400 600 1000 FEET

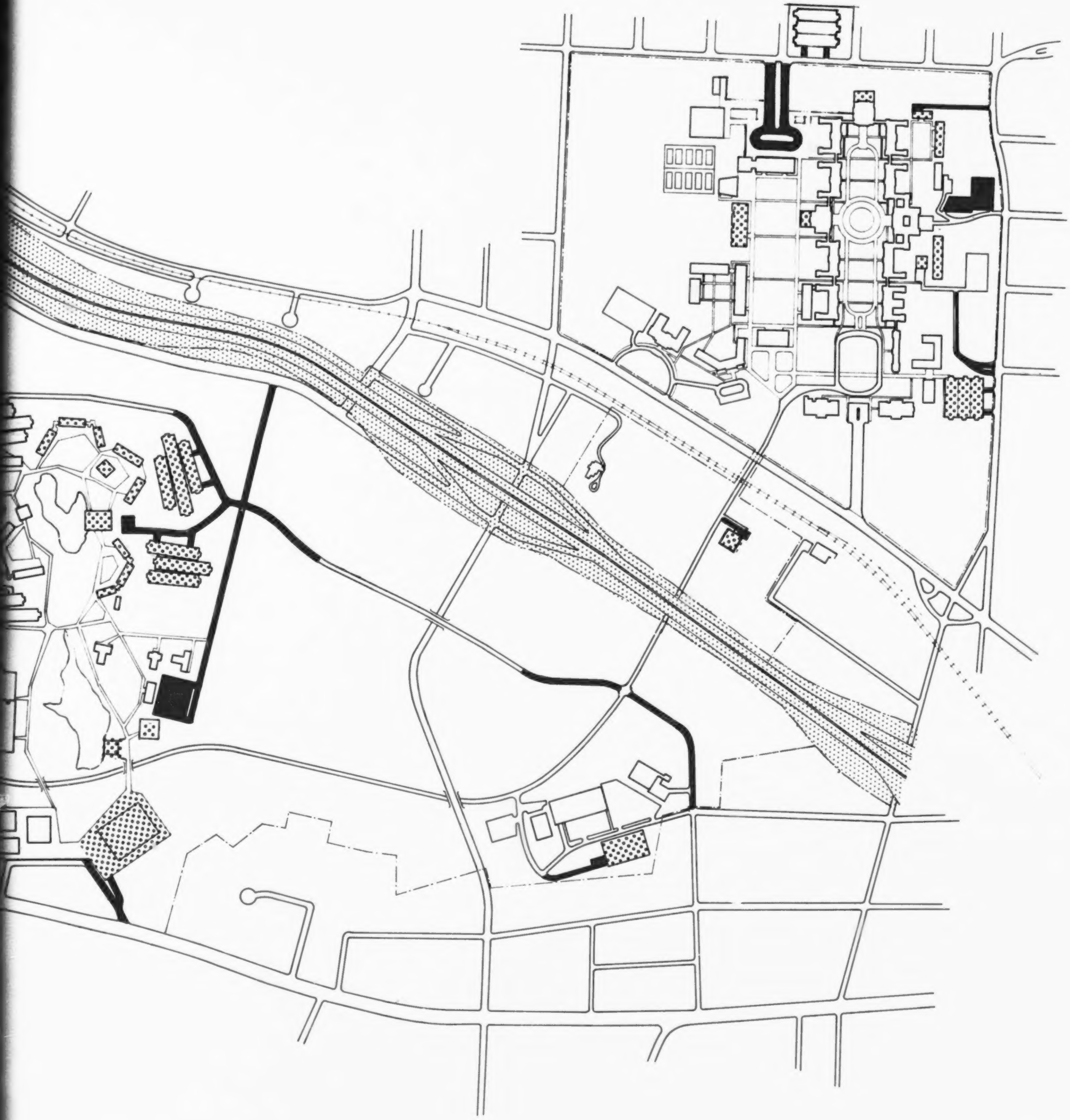
NORTH

CAUDILL
ROWLETT
SCOTT

ARCHITECTS
PLANNERS
ENGINEERS

STAGE B

1968-1975



APPENDIX

TABLE 1 — PROJECTED ENROLLMENT

NUMBER OF STUDENTS	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Arts and Sciences											
Undergraduates	3699	3818	3938	4057	4176	4296	4622	4948	5274	5600	5926
Graduates	1125	1160	1245	1330	1415	1500	1614	1728	1842	1956	2070
Total: Arts and Sciences	4824	4978	5183	5387	5591	5796	6236	6676	7116	7556	7996
Professional Schools:											
Divinity	279	283	287	291	295	300	323	346	369	392	415
Forestry	57	64	70	77	83	90	97	104	111	118	125
Law	280	289	298	307	316	325	350	375	400	425	450
Medicine											
Regular	338	350	363	375	387	400	412	424	436	448	460
Post-Graduate	365	386	407	428	449	470	476	482	488	494	500
Para-Medical	100	106	115	121	126	139	146	153	166	170	175
Nursing											
Undergraduate	277	282	286	291	295	300	300	300	300	300	300
Post-Graduate	13	21	29	37	45	54	58	62	66	70	75
Total: Professional	1709	1781	1855	1927	1996	2078	2162	2246	2336	2417	2500
TOTAL DUKE UNIVERSITY	6533	6759	7038	7314	7587	7874	8398	8922	9452	9973	10496

Source: The Fifth Decade, Duke University, 1965.

TABLE 2 — PROJECTED FACULTY

INSTRUCTIONAL STAFF	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Professors	289	331	350	367	388	405	430	454	477	500	526
Associate Professors	214	247	261	275	285	303	319	335	355	367	388
Assistant Professors	213	245	257	269	282	295	311	328	342	363	378
Instructors	135	154	162	171	178	185	195	205	215	224	235
Total	851	977	1030	1082	1133	1188	1255	1322	1389	1454	1527

Source: The Fifth Decade, Duke University, 1965.

PROJECTED PARKING REQUIREMENTS

Parking requirements were projected for the campus population, using the personnel categories for which parking permits are issued. The requirements were allocated to the 14 zones shown in the map on page 48. It was assumed that current policies for issuing permits would be continued. The following notes explain the development of the projections in the tables.

Table 3. Parking Space Requirements.

Column 2 shows the assumed ratio of drivers (not cars) to the total population in each permit category. These ratios are based on existing characteristics at Duke and anticipated trends in auto use. Column 3 is an adjustment for turnover rate to permit overassignment of spaces where all drivers will not be parked at the same time. The lower rates, such as 1 space per 1.1 drivers, reflect normal absenteeism and travel among full-time staff and resident students. Higher turnover rates allow for shift operations, car-pooling, and part-time student drivers. The space factor, Column 4, is obtained by multiplying the values of Column 2 and Column 3.

Column 5 is the projection of population in each category. Categories 1, 6, 7 and 8 were obtained from projections made by the University. Categories 2, 3, 4 and 5 were projected by applying a factor of increase over current population, based on student and faculty projections. Category 10, Medical Center, was not calculated in this study. The requirement was estimated from the separate plan for that area. The projected space requirements were obtained by multiplying the values of Column 4 and Column 5.

Table 4. Parking Requirements by Zone.

The existing faculty were distributed among zones by adding known groups to be located in zones 3, 5, 7, 11, 12 and 13 and then subtracting them from the total to obtain the number in zone 2. It was assumed that 1/4 of the non-medical faculty would be located on the east campus. These existing figures were then expanded by a factor of 1.8 to obtain the number of faculty projected for 1975. It was assumed that 150 spaces would be required for administrative staff at the Central Administration Building, and 50 at the Service Center. This left 232 spaces of the 432 total. These were distributed to zones as a direct ratio to faculty; 232/848 (non-medical) or, 273 staff spaces per faculty space. Secretarial spaces were then distributed as a direct ratio to administrative staff (1044/432, or 2.41/1). Categories #4 and 5 were assumed to park mainly at the Service Center, and a few were distributed to other zones. Resident students spaces were furnished at their residence. Commuter students were distributed as a direct ratio to faculty (2044/1222, or 1.67/1).

TABLE 3 — PARKING SPACE REQUIREMENTS

1 Category	2 Drivers/Total	3 Spaces/Drivers	4 Factor	5 1975 Population	6 1975 Space Requirement
1. Faculty	1/1	1/1.25	.80	1527	1222
2. Administrative Staff	1/1	1/1.25	.80	540	432
3. Secretarial	1/1.25	1/1.5	.53	1970	1044
4. Maintenance & Operations	1/1.5	1/1.5	.45	1132	509
5. Construction	1/1.25	1/1.25	.64	300	192
6. Resident Students					
a. Men Undergraduate	1/2.25	1/1.1	.40	3083	1233
b. Women Undergraduate	1/8	1/1.1	.11	1914	211
c. Men Graduate	1/1	1/1.1	.91	500	455
d. Women Graduate	1/1.5	1/1.1	.61	100	61
7. Married Students	1/1	1/2	.50	444	222
8. Commuter Students	1/1.25	1/1.5	.53	3856	2044
9. Visitors	1/1	1/1	1.0	2000	2000
10. Medical Center	*	*	*		

*Projected in separate study.

TABLE 4 — PARKING REQUIREMENTS BY ZONE

		Categories									
Zone	Total	1	2	3	4	5	6	7	8	9	10
1	1,315	0	0	0	10	32	1,233	0	0	40	0
2	2,452	514	140	338	20	20	0	60	860	500	0
3	158	24	7	17	10	10	0	0	40	50	0
4	0	0	0	0	0	0	0	0	0	0	0
5	7,000	374	0	0	40	0	0	80	625	0	5,880
6	100	0	0	0	0	0	0	0	0	100	0
7	1,652	98	177	428	5	20	0	0	164	760	0
8	636	0	0	0	40	20	516	30	0	30	0
9	0	0	0	0	0	0	0	0	0	0	0
10	600	0	50	121	359	30	0	0	0	40	0
11	634	149	41	99	5	10	0	30	250	50	0
12	126	0	0	0	5	0	111	0	0	10	0
13	688	63	17	41	10	30	0	22	105	400	0
14	145	0	0	0	5	20	100	0	0	20	0
TOTAL	15,506	1,222	432	1,044	509	192	1,960	222	2,044	2,000	5,880